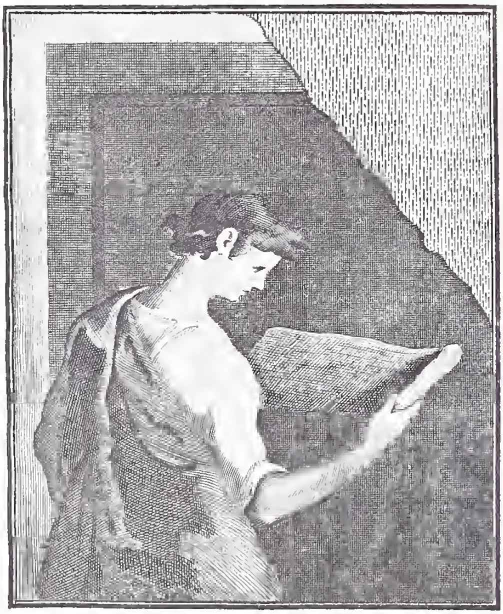

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The British Lithographer.

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THE BRITISH LITHOGRAPHER

A JOURNAL FOR LITHOGRAPHERS · ARTISTS · DRAUGHTSMEN · PHOTOTYPERS · STEEL & COPPER-PLATE · ENGRAVERS &c.

SAXA LOQUUNTUR

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In surveying the field we aspire to fill with this new venture in technical journalism, we have been both surprised and gratified with the generous and hearty reception accorded to us by the lithographic craft—printers and artists alike. From all parts of the country come expressions of goodwill and support in the substantial form of subscriptions in advance, and the result is to place the B.L. on a firm foundation from the commencement. Such a warm and appreciative welcome justifies the opinion we have always held, that lithographers are a spirited body of workers and proud of the position held by their craft, both from an artistic and technical point of view.

Our best efforts will be used to make The British Lithographer useful and representative, and we aim at giving it the front place amongst the lithographic journals of the world.

We reprint our prospectus here in order that our readers may refer to it as a record of promises fulfilled or broken, as the case may be, in our future progress.

The rapid strides which have of late years marked every branch of industry, have called forth the latent energy of all the craftsmen of the nation to keep abreast of the times by devoting more attention to their technical training. This same progress has left its impress upon the attractive industry of lithographic printing. No one could fail to see the enormous improvement in the methods of public advertising during recent years, and those engaged in the business have not failed to observe that much of the finest lithography has been done elsewhere than in this country.

At the same time there is no journal now published in the United Kingdom that adequately represents the Lithographic Art, either in the quality and usefulness of its contents or in its influence amongst the craft.

It is this knowledge that has forced upon us with increased strength the necessity of publishing a journal for the employer and the artisan, which shall

so far as lies in our power bring lithography up to the present day. No one can deny that such an organ is highly necessary, and we feel that the whole trade can and will give a hearty support to the undertaking.

A really useful technical organ cannot be made without the active co-operation of those to whom it speaks, and we are assured that the measure of our success will be in proportion to the extent that your sympathies and help are enlisted in the work.

Lithography, in its comprehensive sense, includes a far wider field for illustration than letterpress processes, and it is our intention to give illustrations, in every issue if possible, of some class of lithographic printing. The great variety of methods and processes precludes us from attempting to give prominence to any one branch of illustration, but it shall be our endeavour, from time to time, to present our readers with prints from one or more of the following classes of productions:—(I.) chromo-lithography in all its styles of stipple, chalk, splash, grain, or line; (II.) monochrome and black lithography as exemplified by portraits, views, writings, and catalogue work; (III.) collotype, with its soft clear tones; (IV.) photo-lithography, as used for reductions in line or colour work and half-tone processes; (V.) copper and steel-plate prints in plain, ornamental, and pictorial work, and in the classical aquatint and mezzotint processes; (VI.) photogravure, with its mellow and artistic power of representing the finest works of art. With this list before us, we shall not, however, omit the more common commercial methods of printing from plain zinc and patent zinc plates, or stone engraving.

The illustrations, although a very important accompaniment of the work, will only be supplementary to the letterpress matter, the primary features of which will be articles upon all the printing processes, old and new, pointing out the shortcomings in our present system, exploding old nostrums and substituting accurate methods for worn out secret processes.

The photo-mechanical processes connected with lithography, as well as phototypic methods, will have special attention. The literature of the subject—at present available only to the few—will be carefully studied, with a view of bringing the *modus operandi* within the reach and understanding of all.

Extracts will be given from time to time from the valuable manual on Lithography by M. Valette, just published in France, and already recognised and accepted as the best practical handbook on the art. It will be revised and adapted to English methods by Mr. Charles Harrap, and the papers will, as far as possible, be illustrated with specimens of work.

These will form part of a series of papers on

"PRACTICAL LITHOGRAPHY,"

which will include articles upon every material used by the printer, not forgetting the coloured pigments, and we shall have in view such practical hints as will enable the printer to overcome the difficulties daily experienced in his work.

Any matters of interest arising from exhibitions will be fully described; recent artistic publications reviewed; current trade topics collected; reports given of the state of trade in most towns of this kingdom. An adequate space will be allotted for "Correspondence," and for articles upon "Trade Questions" of general interest.

The question of technical education is coming more to the front every year. Letterpress printers are advancing in this direction, and in many large towns have well equipped printing offices placed at their disposal for technical education, while a score or more of practised instructors are regularly each session conducting well attended classes. Amongst lithographers we know of but two small classes. This is not as it should be, and THE BRITISH LITHOGRAPHER proposes to look into the matter with a view to extend the classes and assist the teachers in their arduous duties, which are at present with all of them "a labour of love," with but small recompense in the way of results. In this connexion we give, in this number, Reports of the Examinations, and a paper of

"QUESTION PAPERS WORKED OUT,"

being answers by the Assistant-Editor to the questions set by the Examiners in connexion with the City and Guilds of London Examinations. These papers will be found very useful to prospective students in Lithography.

The doings of our foreign confrères will be duly chronicled, and space will be devoted to reports from the various Lithographic Trade Societies. Other features will be developed as time progresses.

A novel departure will be made — not hitherto attempted in the trade—by establishing a

"NOTES AND QUERIES"

section. Through this channel anyone submitting a question upon printing or allied processes can receive an answer, either from our staff of practised technical writers secured for this journal, or from some reader who may be better qualified to answer "special" questions.

A sharp look out will be kept for new methods and processes — especially those of a labour-saving character—which will be tested and reported upon by practical workers.

The literature of the art and trade will be carefully studied so that nothing of value may be allowed to pass unnoticed.

Interesting matter, not perhaps quite of a practical nature, yet always acceptable, will occasionally appear, such for instance as descriptions of well-equipped printing establishments. Arrangements are being made for a series of biographies, with portraits, of eminent lithographers.

The foregoing programme will require time to work out; but in all we do, in every issue, we shall endeavour to give both interesting and useful matter to the craft—employers and employed. Any reader is invited to contribute practical papers on subjects which are deemed of sufficient interest.

No effort shall be spared to secure THE BRITISH LITHOGRAPHER being worthy the support of the craft. In style of production the same spirited course shall be pursued that has made the sister journals published by us—THE BRITISH PRINTER and THE BRITISH BOOKMAKER—so successful and so useful to the trades they respectively represent. All we ask in response is your generous sympathy and support.

Photo-Mechanical Lithographic Printing Processes.

INTRODUCTION.

ALTHOUGH certain effects, such as the darkening of fused silver chloride on exposure to light, were known three hundred years ago, and in 1777, Scheele, the Swedish chemist, demonstrated that the red of the solar spectrum had little or no effect in causing this change; yet the discovery by Thomas Wedgwood of taking profiles upon paper treated with nitrate of silver, was merely a preliminary to the gradual development of the art of photography. Wedgwood took the profiles, but could not "fix" the pictures, and it remained for years in this unsatisfactory condition until Sir John Herschell suggested the use of hyposulphite of soda—the "hypo" of the photographic handbooks of to-day—by which means photographic prints were first made, in a degree, permanent. It is difficult to those who have never known the puny attempts in this art to imagine in what a condition it was in 1839. Photographs were then unknown. The camera was unknown. It was in that year that the combined energies of Heny Fox Talbot and the Rev. J. B. Reade solved the first great problem. In their experiments they used the camera obscura for focussing a picture upon paper covered with chloride of silver, and after exposure, the image was developed by washing in a solution of gallic acid. Thus was produced a negative, from which positives were produced by placing them under these negatives when made transparent. It was in 1839 that Daguerreotype was discovered. About this time M. Niepce discovered the sensibility of bitumen to light, a discovery which has not been forgotten, and is largely used at present by the most skilful photo-etchers. The year 1840 put the finishing touches upon the whole art; the principles underlying the process were laid bare, and the subsequent fifty years have added to the practice, but have not added much to the fundaments. The use of iodide of silver in 1840 and the discovery of the sensitiveness of potassium bichromàte solutions in the same year completed the cycle. The improvement, as to holding the sensitized salts in a film of collodion on glass was due to Mr. Scott Archer, in 1850, and it was then customary to use both bromide and iodide of silver. This was the first attempt in the wet collodion process—a process, which for photo-mechanical printing processes still holds its own against the dry-plates of recent invention. It is not intended to detract from the use of dry plates for a moment, but for our purposes the wet collodion has been proved the most successful. Thus in the last fifty years, only one-half of the time that lithography has been in vogue, photography has advanced to its present perfection and plays its important part in the world. But it is not with the history of the art, nor with photography pure and simple, that we are about to concern ourselves; it is rather with its most recent developments and applications to commercial printing and book illustration that we shall occupy the attention of our readers in these papers. However much specialists may be depreciated—especially unnecessary specialism, which means devoting time to the development of one branch only of a business, whilst any individual with an ordinary English capacity could cover the whole ground—yet in these photo-mechanical processes, specialists are the only persons who have as yet added anything to this new art. It has only been by a fortunate sequence of circumstances that skilled photographers have had their attention drawn into the groove of lithographic and typographic printing, and few as these experts are, it is astonishing what enormous progress they have made and what a large field they have covered. Their information is most valuable, for whatever they have done, it has been recorded with such accuracy as to make it doubly reliable. No one can gainsay that the photo-lithographic processes have become a most important adjunct to printing generally. Undoubtedly, there have been many experiments in this branch, which, at the outset, were considered developments in printing, and for some time were practised, until it became apparent that photography was not needed in these particular lines. Such experiments, however, were simply steps to greater things, and the lithographic establishment of to-day which attempts to carry on business without the aid of photography does so at a great disadvantage, both in rapidity and price of production. Artists are glad to invoke its aid in the preparation of differently coloured sketches of the same design and in preparing their grey feints of the original, whilst pattern producers avail themselves largely of its assistance in making accurate reductions both of the key and colour stones.

It is not long ago since the market was well canvassed with reducing machines. Intricate appliances with sheets of india-rubber and side screws were devised to accomplish this end. But who would now think of using these instruments, since it has been demonstrated in thousands of instances how cheaply and accurately this process can be effected by photography. At first, when photographers had not learnt the proper use of the camera and the limits of accuracy of their lenses—in fact before the rectilinear lenses had become popular—reductions by photography were most abnormal; but things have changed since then and copper and steel-plate engravings have not escaped the same onslaught. Large plans, which formerly were engraved on a smaller scale, at an enormous cost, are now reduced by photo-lithography, and in such a state of excellence as to vie favourably with the original engraving. Not alone as a mere agent for reducing does this process play its part. Its later developments are treading closely upon the heels of the methods of producing copies of natural objects. Heretofore the artist upon grained paper or grained stone has copied the objects, whatever they may be—portraits, landscapes, or isolated subjects from nature—in a faithful manner, omitting such effects as he thought detrimental, and adding such touches as he

believed necessary to bring out the features of the work. But, though this artistic method will never die out, for many commercial purposes the photo-lithographic process in half-tone will greatly take its place. The half-tone process of producing photo-etched blocks, samples of which are flooded all over the world, prepared so successfully by the firms of Meisenbach, Sprague, Loës, The Levytype Company, Densmore, Stevens & Morris, Kurtz Process Company, Photo-Electro Engraving Company, Ramsey Engraving Company, New York Engraving Company, Photo-Engraving Company New York, Boston Photogravure Company, Crosscup & West, Bartholomew & Peckham, Electro-Light Engraving Company, Wilkinson, and The Moss Engraving Company, has become a great success, and is in a far more perfect condition than anything yet accomplished by half-tone operators in lithography. This process is very far behind and at present is a drawback to the ambitions of the striving photo-lithographers. There are half-toned processes, which will be noticed in due course, but their successful manipulation is confined to very few, and this particular branch will require greater attention before it reaches the position held by photo-etched blocks. Wood engraving, too, has felt the effects of photography more keenly than any other process: for whilst it has been an adjunct to lithography and plate engraving, it has in a less degree assisted wood engraving, and in a far greater degree supplanted it, by the production of the type blocks, so much in favour for book illustrations at the present time. Supplementary to photo-lithography, is the now well-known Collotype printing, which in many of its details is so closely allied to photo-lithographic and lithographic printing as to render it but a branch of the great scheme of printing. Here is a process, actually superseding chalk drawings and other modes of copying nature. Where other methods fail, this one is a success, and now that it has become a marketable commodity, there is no saying where it will end. Worked in conjunction with chromo-photography it can be used to produce landscapes from nature, almost in their natural colours, and what is true of landscapes is true of coloured designs. Collotype printing has now been before the public for a number of years. Herr Albert introduced it under the name of Albertype or Lichtdruck, and his method has been imitated, with but very small modifications, by other European and American operators. Whilst Albert preferred to print from the gelatine film upon a glass, Mr. Edwards so prepared the glass beforehand that the film could be removed and attached to a metal plate for printing from. This process received the name of heliotype (helios = the sun), or sun printing. Advances have been made; each operator has brought his skill to bear upon some particular branch, until the process cannot bear any other individual distinction than collotype (kolla = glue) or glue printing or printing from gelatine.

The efforts to print from gelatine have not stopped at the collotype process, but by that energetic German manipulator, Herr Husnik, the method has been used for producing blocks, which may be printed from in the type press. The success attending this new departure cannot be considered great, but, like other inventions, it has a small beginning, with the prospects of a prosperous future for Leimtype printing.

Herr Husnik has applied himself to the manufacture of prepared paper for photo-lithographic transfers, and has so far succeeded that at present paper can be purchased in its initial stage of preparation, only requiring the final sensitizing to make it ready for use under a negative.

Certainly, these branches of the business require careful manipulation, and it may yet be some years before every printer is accustomed to them. But it is no time to despair, improvement follows improvement so closely, and every one endeavours to introduce some simplification, that ere long the process will be within easy grasp of even the slowest individual. Already, firms have seen it to their advantage to launch into the expense of attaching plant and studios to their printing works, for these processes alone. Photographers and lithographic artists have turned their attention to the subject, and many of them are in a high way towards success. It is not that the majority of men cannot understand the methods, but it is rather the lack of time and proper appliances.

In the course of these papers the whole photo-mechanical printing processes will receive the most careful attention, and our readers will be in possession of the fundamental principles, with all the accessory formulæ and modes of procedure to enable them to acquire a thorough grasp of the subject.

"Plant-Form" Supplements.

EVERY artist knows the value of having reliable drawings always at hand for reference, but as yet they have only been published in large and expensive works not within reach of the modestly lined pockets of the lithographer. It has been suggested to us that a series of "Plant-Form" Supplements, drawn from nature, would be a valuable feature of THE BRITISH LITHOGRAPHER, alike useful and suggestive to the artist and designer. Arrangements have, therefore, been made with a capable artist, Mr. T. B. Widdowson, who has devoted considerable attention to this class of art work, to furnish a series of drawings, which will be printed in monochrome on a tint ground on special plate paper, so that they may be taken out of the journal and used as studies. The first "Plant-Form" Supplement will appear in our next number.

GREAT are the preparations for the World's Fair of 1892, at Chicago. Colonel Anderson, the special commissioner, has addressed the National Convention of Lithographic Printers at St. Louis, with the intention of raising their spirits to active co-operation in making the great Exhibition a success. He very properly remarked that printers are fellow promoters in all these undertakings, for where would they be without the posters, show cards, plans, guides, or handbooks, so necessary to make a show go, and to instruct the visitors to it. The printers have decided to make a collective exhibit of the history, progress, and present state of the lithographic art.

Alf Cooke, J.P., Mayor of Leeds.

·S·C·R·L^TD·

Works, which, for capacity and beauty combined with practicability and method, are probably unsurpassed by any industrial premises in the kingdom.

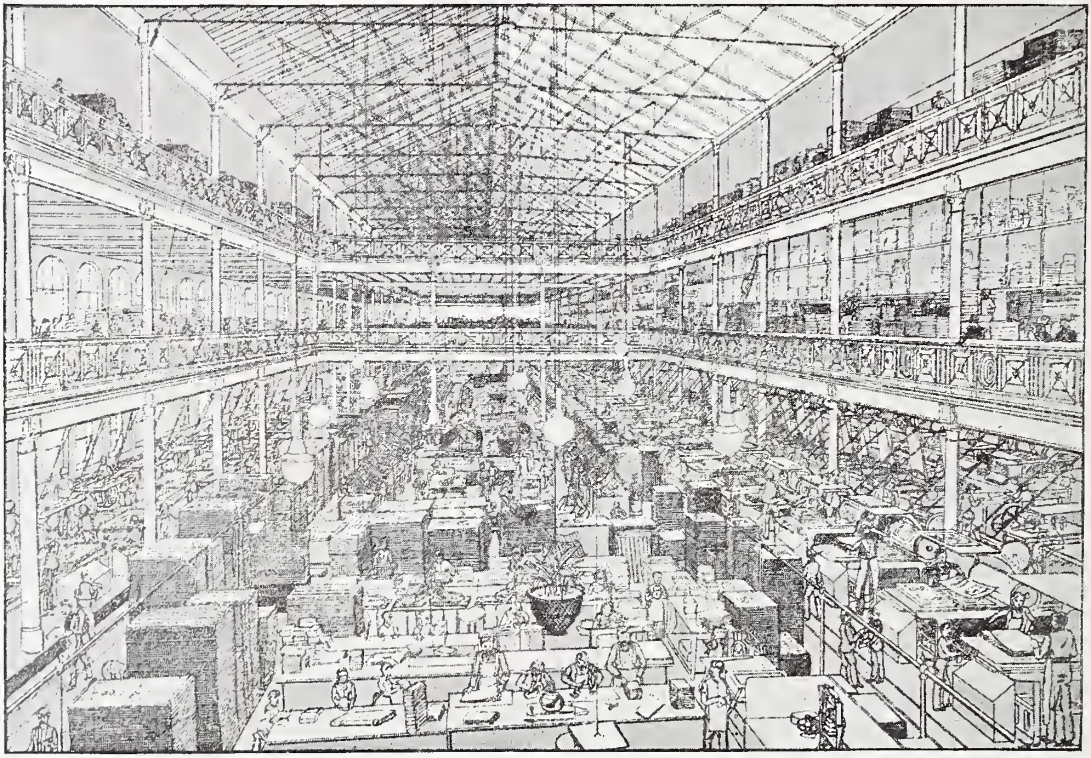
In the midst of the multifarious duties necessarily entailed by the care of such an immense business, Mr. Cooke has found time to devote himself prominently to municipal matters. In 1883, he was returned unopposed to the Council, and his keen perceptive faculties and business aptitude quickly marked him as one of the most useful members of that body. In November, 1890, by the unanimous vote of the Council, he was elected chief magistrate of his native borough, a position which he has filled with much dignity and credit alike to himself and the important town of Leeds, while in February last he received the further honour of being placed on the Commission of the Peace.

A valuable testimony to his services in the art of colour printing and appreciation of the Crown Point productions was his appointment, in 1885, as Her Majesty's colour printer and sole chromo-lithographer, an appointment which Mr. Cooke highly values.

For the personal characteristics of Mr. Cooke, it may be truly said that his geniality and general kindliness are proverbial, and he is hospitable to a fault. In his private surroundings and in his treatment of his employées, the same uniform sympathy and kindliness prevails, whilst more than one occupying at the present time a good position in the town owe their success to his timely and judicious assistance.

THE CROWN POINT WORKS.

THIS splendidly-equipped establishment is situated in Hunslet-road, near the centre of the town of Leeds. The building is a boldly outlined structure of three storeys, with a richly carved corner of approach surmounted by the Royal Arms. The countinghouse inside is terminated by the proprietor's own sanctum, which is connected with each of the various departments in the building by a system of telephones, electric bells, and speaking tubes; from the outset, concentration and system are noticeable. Adjoining the countinghouse is the main building, a large rectangular room with two galleries stretching above, supported by iron pillars; over all is a glass roof, supported by light iron work and open to the top, while the decorated fronts of the galleries together with framed productions from the presses add to the brightness and animation of the scene. Along each side of the ground floor run litho. printing machines and printing presses, while the centre is occupied with bookbinding, stitching, folding, cutting, and despatching operations. In a line with this, but situated in the new wing, is the composing department, and to the right of that are placed the letterpress printing machines, the mechanics' and joiners' shops, and the



INTERIOR OF CROWN POINT PRINTING WORKS, LEEDS.

blacksmiths' forge, while adjoining the boiler-house is the stereotyping room. The stone-polishing department is conveniently placed at the rear of the litho. presses. The whole floorage available covers an area of about 6,000 square yards.

Among the machinery in use there are many makes and types, but the whole establishment abounds in ingeniously constructed labour-saving machines. Such numbers of machines of various sizes and capacity afford scope for an immense variety of work, allowing facilities for the production of orders ranging from the simplest commercial memo. form to the splendid chromo pictures for book illustration.

Rewards are offered for the care of machinery and plant, with resulting attractiveness in the appearance of the rooms.

In the letterpress department, every class of work, from the cheap hand-bill up to the best book and colour printing, is executed, and, as far as possible, all mechanical work is done on the premises; the stereo department is another useful adjunct. Mr. Cooke is his own ink manufacturer, and several grinding and mixing machines are kept constantly at work.

Among minor branches of business carried on in these colossal works, may be mentioned those of paper-bag making by hand and machinery, and, in connection with the large almanac, show-card, and label trade, are the making-up, varnishing, eyeletting, punching, &c.,—operations mostly performed by machinery; while the processes of engraving, die-sinking, die-stamping, embossing, &c., are also carried on.

The whole of the establishment is well supplied with the electric light, obtained from dynamos adjoining the boiler house, and every department shews that attention to detail so absolutely necessary in such a creation as the Crown Point Printing and Colour Works.

It is perhaps needless to state that in the lithographic portion of the works, the department specially devoted to the artists stands prominently to the front, and true artistic conception and execution are found here. A large staff of litho. artists is kept constantly at work, while the mere fact of their employment here is a guarantee of their competency. As in all such establishments, and this is especially the case at the Crown Point Works, all the work is divided into distinct departments. One set of artists are considered good on commercial work or as "writers," others are equally good at chalk drawing upon grained paper, or in line and stipple upon paper, and there are others whose experience marks them out as draughtsmen upon stone—even this being sub-divided, and the production of plans, section and machine drawing is a special department calling for exceptional adaptability. All these various departments are grouped in the large lithographic section of the works.

A brief outline of the way in which the work is put through may be interesting. To take any special piece of work, it is first necessary to submit a sketch and afterwards the fully coloured drawing to a client, and lithographers understand the labour and careful attention involved by an artist, who must combine a full knowledge of practical lithographic drawing along with his artistic abilities. When approved, the preparation of a keystone—embracing in outline every feature of the drawing—is proceeded with, and having previously decided upon the number of colours in which the work is to be produced, the artist decides as to the particular colours to be used and the manner of blending so as to obtain the requisite soft effects and strength of detail. The work commences by making up faints upon other stones as required, so as to ensure perfect register. Deciding upon the order of sequence for the colours, the artist takes up the first stone and proceeds to "put in," by stipple or otherwise, the exact proportion of work this colour is to exhibit in the completed work. This stone is then proofed in slightly varying shades, such shades being carefully noted down, and as the various drawings of colour after colour are thus completed, they are in turn "proofed" in with or upon the preceding colours, until the exact effects have been obtained. When all the stones are drawn and the effect approved, the work is passed on to the machines and worked off in the same order as the proofing.

In this establishment the tints are prepared for the machines in a special department, avoiding the old method of mixing at the machine side, and the system ensures economy, accuracy, and cleanliness.

The handsome "Album of Colour Printing" issued by Mr. Alf Cooke show as much the extent of the patronage he receives as it does the high artistic excellence and admirable finish of his productions. The specimens—monochrome and chromo—represent supplements to well-known high-class magazines and periodicals, covers and plates for florist's catalogues, and advertisements for well-known firms, as well as reductions from Alf Cooke's own series of fine chromo calendars. A characteristic portrait of the genial proprietor appears as frontispiece, with a fac-simile of the royal warrant of appointment on the opposite page. We do not remember ever to have seen within the small space of twenty pages such a really fine exhibit of colour printing.

Transfer of a Photo from Chromate Paper to Zinc.

Place the chromate paper containing the photo for ten minutes between two sheets of paper which have been saturated in a one-fifth solution of nitric acid in water. Upon the zinc plate place a piece of paper which has been previously soaked in nitric acid and pull through the hand press, which will cause a slight etching of the surface of the zinc plate; the sheet of paper is taken off, and all traces of nitrate of zinc are carefully removed from the zinc plate by means of a blotter.

The photo is then transferred upon the plate, gummed over, etc.; it is then rubbed in with ink, which has to be thinned with olive oil, and when all details appear sufficiently strong the plate is etched with a preparation made by adding a small quantity of phosphoric acid to a gum solution. When a drop of such a preparation placed upon a polished zinc plate discolours the same and affects its purity, then it is of sufficient strength.

Practical · Lithography.

By Charles Harrap.

INTRODUCTORY.

MUCH has been said, much has been heard, but very little has been written of the multitudinous variations which have crept into lithographic processes during recent times. It is fully twenty years since any work was published dealing in detail with lithography. Although there has not been any absolute change in the original principles discovered by Senefelder nearly a century ago, and applied by him so successfully until his death at the age of 63, in 1834—little more than fifty years ago—yet, there have been hundreds of variations in the application of those principles, which have been transmitted from office to office, and country to country, and have been contorted in so many ways, owing to the innocence of the transmitters, that it is high time, for the good of the craft, to chronicle what has really taken place and what has been discovered in the past twenty-five years. Unfortunately for the business, there are very few printers who can give a scientific explanation of any single act which is performed upon a stone. What printers do nowadays —many of them in excellent style—is by rule of thumb. To constantly work under that system means that there is an undue amount of monotony and drudgery introduced into our daily toil, over and above the fact that difficulties which crop up have to be dealt with by the same unflinching rule, or work has to be done a second time and the error thrown on to some other shoulders for the want of a clear understanding of the cause and effect of all lithographic processes. Such a practice cannot lead to healthy and progressive industry, and it is the object of these papers to unravel the mysteries which have surrounded the craft, and treat in a practical manner all the present known processes involved. The value of such an undertaking is two-fold. It creates an interest in what was hitherto a dumb series of processes, by shewing the why and wherefore of every act and its chemical or mechanical result; it breaks down old and mistaken notions, and it lays the foundation for new ideas and new discoveries which may lead to greater triumphs and greater commercial prosperity in the business which is now the precursor of so much popular enthusiasm over the grand lithographic productions from all parts of the world.

However much credit we may take upon ourselves for the improvements in later times, we must give the full meed of praise to the inventor, whose indomitable spirit led him on through financial embarrassments and practical failures, to make one of the greatest discoveries of the eighteenth century. To look back upon his career, it cannot but be felt that ordinary men would have thrown up the task at a very early stage, and it must certainly have been some internal prompting which ultimately resulted in lithography.

Accident has always been fertile in laying the foundation of invention. How many men have started with a definite purpose, but by a collateral accident have turned their attention into another groove, and have had unlimited success in it. Such an accident may be shewn to have resulted in lithography. When Aloys Senefelder, after careful training in the law at Ingolstadt and Göttingen, was left fatherless, and found that his mother and the eight other children were dependent on him for support, he turned his mind enthusiastically to what then appeared to him to be his line of genius. Whether that was so or not is a matter of question, for as time rolled on and he became more and more involved in printing, so he lost sight of his original aim in life, until finally it is not even mentioned in his later annals. The particular vocation he originally followed was play-writer and actor—the calling of his father. In this capacity he wrote and acted in his piece entitled, "Le Connaisseur des Femmes," after two years of disappointment in his attempts to obtain engagements at the theatres in Ratisbon, Erlangen, and other places. As exemplifying his character, disappointments did not deter him, and like a good lithographer, he commenced his work over again rather than be baffled. However, after a first gleam of success, he was again confronted by difficulties, and travelled with a troupe of comedians until he realised his hope of an engagement at the Munich theatre, in 1791. His income was small and he sought to increase it by writing dramas. He published "Mathilde d'Altenstein," "Le Frère d'Amérique," and "Les Goths en Orient." His smallness of resources compelled him to publish these works in very small editions, and he next turned his mind to find some way of publishing at less cost and at greater speed. In this direction an attempt at stereotyping with wax proved futile, for the wax would not withstand the pressure. This novel idea may be set down as the discovery of stereotyping. Failing in these new attempts, he returned to engraving on copper—a tedious process to an unskilled man—and found that he required much practice. He necessarily had to often clear the plates by grinding with pumice. The cost of the pumice led him to try instead a class of stone which he had seen on the banks of the Isar. This stone proved quite a success, and in the process of grinding the plate took a fine polish itself. This feature led Senefelder to use the stone to practise upon instead of copper. His method, of course, was still to engrave rather than write upon the stone; and how he came to discover the necessary ingredients for the ink can only be conjectured. Possibly he used printers' ink and obtained a recipe for its manufacture, and having the basis, built up the composition which ultimately proved to be *the one* for the purpose.

"At last," writes M. Valette, "accident, the deity of inventors, presented an opening to Senefelder by means of a laundry note. One day in July, 1796, Senefelder was about to put the grounding on a stone destined to receive the graver, when his mother came into his room and asked him to make a note about the washing. Few of our readers will be ignorant of the disorder usually found in an artist's room, and that of Senefelder was at this moment in such a condition

that he was unable to find a piece of paper suitable for the purpose, moreover his writing ink was dried up. He mechanically dipped his pen into the plate ink and wrote the note his mother asked for upon the stone, promising to make a copy of it later on."

Before polishing the stone for his usual practice, he bethought himself to cover the surface with a mixture of $\frac{9}{10}$ water and $\frac{1}{10}$ nitric acid, and left it for five minutes. Then he examined the action of the acid, and noticed that the written characters had been left in relief upon the stone to the thickness of a playing card. It then remained for him to find some means of inking the raised characters upon the stone different to the means employed in inking the engraved copper or zinc. "After experimenting," M. Valette proceeds, "he then took a disc of wood covered with felt, something similar to the inking pads used for engravings upon stone. The results were far from brilliant, but satisfied the wants of the moment." Thus, in a rudimentary, rough-and-ready style, lithography was first invented. Whatever improvements followed must have caused a rapid development of the ways and means, for, before the year 1796 had closed, a press was actually constructed, by a musician of the Bavarian court, with whom Senefelder had become partner. Time rolled on: Senefelder entered into a partnership with M. Glessner for printing music scores in 1798, and a second press was constructed. Notwithstanding this apparent progress, poor Senefelder was sadly reduced, and in his poverty accepted two hundred florins to go as substitute for a gunner in the conscription, but to his chagrin the army official refused him on account of foreign extraction. Let us mark the succeeding events, briefly narrated by the French author:—

"In 1799, Senefelder's invention was complete and he obtained from Joseph Maximilian, King of Bavaria, patent rights for fifteen years. Towards the end of 1798 he obtained the Academy's Gold Medal. In 1799 he took his two brothers into partnership, and in 1800 sold his secret to Messrs. André Brothers (who afterwards established a lithographic house at Offenbach) so that he might travel to London and make his processes known there. Rapid progress was made in the art, and in 1801 most of the principal German towns possessed lithographic establishments. In 1802, after having transferred his business to his brothers, Senefelder went to Vienna, and there obtained patent rights for ten years. Here he founded a professional school of lithography, which is still in existence and does some of the Imperial printing. In 1806, he sold his establishment and rights and returned to Munich, where he remained until 1810, when he was appointed superintendent of the Royal lithographic establishment, at a salary of 1500 florins per annum. This position he occupied until 1819. The same year he went to Paris, where he published his 'Treatise on Lithography,' illustrated with a collection of designs by the first artists of the day and printed by himself." So M. Valette brings to a close his account of this energetic man, who lived to see his invention a success, and to a considerable extent participate in the worldly profits of it.

Our readers will pardon so much reference to Senefelder's history; but, we ask, who could introduce a subject of this nature without full and befitting details of the inventor, who was alive at the time when many of the present leading lithographers were in their childhood and early manhood. Not to have done so, would have been a discourtesy.

Little, probably, did the great Senefelder dream of the applications to which lithography has been put; although it can be gleaned from early accounts that he had large expectations of its future. But he certainly was not aware of the close alliance which would ultimately spring up between lithography and photography, as well as the interworkings of typography with lithography. In its infant days, the process was invented for commercial purposes, and it was not until it was patronised by leading artists in France and in England that the public began to recognise its great utility for copying pictures, and as a cheaper means of publishing original drawings. Thus, having brought the process to a high pitch, the "commercial man" again came upon the scene and utilised the process for all means. Gradually is seen the commercial lithography overpowering the artistic lithography, which had almost become a hobby with many well known artists, and from the original black commercial printing, colour, shape, and—lastly—taste, have crept into what is now a necessity to the world in general. So common nowadays is a lithograph or chromo' that many pass over them lightly, little thinking of the pains and brains which have been bestowed upon the production. Not only has the original idea been much enlarged in its scope of production, but the means of production have been multiplied. When lithography was mainly produced upon grained stone or engraved stone, the uses of splashing, stippling, plate-ruling, and transferring were not understood. But, as when Senefelder discovered the process—by etching, so was the idea of etching perpetuated for years, ultimately to die out, only to be revived again during recent times. Even now, it seems probable that it will become less used again, however much advantage can be gained by good relief; and thus the whole process has been subject to constant changes.

The bringing in of zinc plates marked a new era of ingenuity. The idea of zinc plates being more durable and more easily manipulated than cumbersome stones, soon caused men's brains to devise the sprinkling of a coating of calcareous matter upon thin plates, so that plates could be even cheaper and still retain their durability. The last few years have produced quite a number of these patent plate substitutes for stone, and as a proof that that particular branch of invention has not reached perfection may be seen from the fact that in the majority of instances artists cannot work upon them with the same ease as upon stone, and their printing qualifications debar them from the wear and tear of the ordinary stone. The price and weight of stone have always been its drawbacks, and efforts have not been few—although as yet unsuccessful—to entirely replace the stone by a manufactured block.

Another phase of the peculiar developments which have increased the commercial prosperity of lithography is the intimate connection with photography.

From the earliest attempts at direct photographic printing upon stone, there has been an unceasing series of improvements, until the whole process of photo-lithography has become so distinct and so extensive as to claim the attention of another set of craftsmen, whose daily occupation is devoted to it. So long as photegraphy cannot be brought to the point of printing coloured subjects, so long will lithography be the necessary adjunct of photography, and even though it may be found that chromophotography is possible, yet the means of printing a large quantity will still be dependent upon lithography.

Chromolithography, even, is one of the later developments in the business, and has reached a high state of perfection. It has its drawback, and that is the speed of production—both upon the stone and in printing. Both of these are slow, and it can only be by such mechanical means as the shading medium, or grained plate transfers, or photography, that the drawing can be expedited ; whilst the printing seems doomed to rest in its present position until the introduction of genuine quick-drying inks, coupled with mechanical arrangements to print several colours at one time—similar to calico printing, in which ten colours are put on the cloth in one run through. There was an attempt to meet this want some four or five years ago, when prints were obtained at one impression by an intricate method of laying a mosaic of coloured pigments, but nothing very lasting has been the result.

Such, in brief outline, are the new features which will be dealt with in greater or less degree in the course of these papers.

Since the days of its invention, this process has been conducted with far greater energy in Germany and in France than in this country, and it is with no small feeling of pleasure that the experience of this practical French author—M. Valette—will be greeted by all in this country as a valuable contribution to the present very scanty literature upon the processes of lithography.

[*To be continued.*]

Lithographic Rollers.

PROPER treatment of lithographic rollers, in and out of use, is a subject which should be carefully studied, and thoroughly understood by every practical lithographer, pressman, and printer alike.

A new roller is obtainable in three grades, namely, smooth, fine grained, and coarse grained. The smooth roller is made by two different methods. The first is by turning the leather skin, that is the smooth side, outside, and the second by scraping off the rough surface with glass. The coarse grain roller is used just as it is cast, and the fine grained is obtained by several different methods, according to how fine, or according to the technical term, how "sharp" the grain is desired. It is unnecessary to inform our readers about the many different methods employed to accomplish these results, as it will be sufficient to let them know how to treat them when obtained.

Our advice is that all rollers when new should be treated alike, and the method of treatment recommended is as follows : First, roll up the roller with raw linseed oil, and let it absorb as much of it as possible. Repeat this treatment for two days, keeping the roller in a saturated condition. Then scrape it clean, and roll up with No. 2 litho varnish, repeating as often as necessary to keep the roller in varnish, but be sure to use *pure linseed oil varnish,* as the use of resin varnish will make the roller dry and hard, and keep the grain laying flat "dry" on it. Such a roller, when not treated properly is spoiled for ever.

After the roller has been four days in varnish it should be scraped as clean as possible ; then ink should be applied, from time to time, until the loose grain is removed from its surface. The more the ink slab and roller are scraped and cleaned, the better the roller will be hereafter. To commence with, the roller should be used on the most common work, and this advice is as applicable to the hand made as to the steam press roller. When, however, it is found impracticable for lack of time or other causes to adopt the foregoing treatment, the superfluous grain may be burned off by the following methods : Roll up the roller in glycerine (after the roller has been treated with varnish and ink) ; then on top roll up turpentine and apply a lighted match to same, turning the roller continuously while the turpentine is still burning. Next scrape it when in a warm condition after the turpentine has burned itself out, but without blowing it out, and when clean the roller is ready for work. It is advisable to scrape rollers every night, when leaving work, and when they are put away for a longer time they should be rubbed with clean tallow, which, of course, has to be removed when they are used again.

Old rollers, when the grain has become flat and the surface hard, should be burned and treated in the same manner, with turpentine, as mentioned. Where the ink, by neglect, has become so hardened on the roller that this remedy will not prove thoroughly effective, sand or emery paper may be used while the roller is yet warm, and it will be made almost as good as new. Sandpapering it when cold, however, or a treatment with glass, will simply scrape the grain away and make the grain flat and the roller smooth, and therefore should not be done.

The general rule is : First, a smooth roller requires less ink on the surface and allows more easily a solid *impression,* but it fills up the work more frequently than a grained roller. A fine grained roller is the most suitable for commercial and fine work, and a coarse grained one is the best adapted for crayon and close work ; therefore the best impression is obtained with a fine grained roller, to roll up the work upon the stone solid, and the coarse grained roller to roll off the work sharp.

The practical printer on hand as well as on steam presses, who knows these facts and acts accordingly is the workman who deserves to rank as "first-class." —*The Artist Printer.*

The Adulteration of Colours.

Part I.

NOWADAYS there are very few colours which do not allow of the admixture of foreign substances, and even whilst pursuing the most approved methods for obtaining the best work, printers do not obtain results commensurate with the care expended, unless they are acquainted with the adulterations frequently used. It goes without saying that printers should be in a position to discover these faults, and we invite the observations of colourists in relation to the colours they use and the difficulties they are beset with.

We will commence with the various whites, and note the methods of obtaining pure tints and of restoring blackened and faded tints to their original freshness.

THE WHITE FROM WHITE-LEAD.—White colour containing lead should be compounded on a body of varnish or oil. If without, it is liable to darken and take a leaden hue after impression, when it will need a coat of varnish to enable the colour to resist the effects of the more or less hydro-sulphurous vapours in the atmosphere. [To restore white in old drawings: The use of weak oxygenated water gently applied with a soft brush is a good remedy. This causes the dark shade to return to its original tint without injuring or altering the tone and surface of the paper.]

THE ADDITION OF CHALK TO WHITE-OF-LEAD.—There is a simple method of proving the presence of this kind of adulteration. Hollow out a fresh coal with a knife, and put into the hollow a little of the suspected matter, first crumbling it between the fingers; then put a light to it and gently blow over the flame. The lead will soon become yellow, and in a short time a number of brilliant metallic globules will make their appearance. These globules are the lead, revivified, and rendered thus by the separation from the carbonic acid. If chalk is present the carbonic acid will also be set free, but the carbonate of lime remaining will be unchanged and infusible.

WHITE OF ZINC ADULTERATED WITH SULPHATE OF BARYTA.—This is easily detected by treating with nitric acid in a shallow dish. The sulphate of baryta, when present, will remain unchanged, while the oxidised zinc will be totally dissolved.

WHITE OF ZINC ADULTERATED WITH SULPHATE OF CHALK.—If ground in oil, calcine ten grammes in an earthenware crucible. When the oil is decomposed leave it to cool and afterwards treat it with distilled water. Now pour in a few drops of nitric or sulphuric acid, which will have the effect of releasing the hydrogen or hydro-sulphuric gas in large or small quantities according to the impurity of the white. If the white is in a powdered condition the proof will need a purely chemical operation very difficult to explain here.

WHITE OF SILVER.—This white is frequently adulterated with sulphate of baryta. When this sulphate has been obtained by precipitation and forms what is known as a fast white, the injury is not great, for the white covers well. But where the manufacturer is satisfied to employ natural sulphate of baryta or heavy spath, even though it is very finely ground, there will always be evidence of the grain when in use, and the working will not be satisfactory, more especially in lithography. There is no difficulty in ascertaining the altered quality, as the whites of both lead and zinc are soluble in nitric acid; if then, after treatment with aquafortis, there is a residue of white substances, it is certain that foreign matter has been compounded with it.

CADMIUM YELLOW.—This yellow should not be mixed with the leaden colours, for the sulphur it contains has the effect of blackening and decomposing the lead.

NAPLES YELLOW.—Whether in a natural condition or artificial, this colour becomes green when brought into contact with the stone or with iron and steel. To obviate this, the colour should be ground on marble and afterwards collected with a horn or ivory blade.

YELLOW LAKE.—This must be likewise prevented from coming into contact with iron, as the resulting action causes a darkening of the colour.

YELLOW OCHRE.—This yellow forms a very solid colour when in combination with clay, but if Naples yellow be added to it this solidity disappears.

CHROME YELLOW.—This variety has an injurious effect upon almost all tints it may be introduced among. Pure chrome yellow is compact and easily ground to a fine powder. When rolled between the hands it adheres easily without moisture. It is frequently found in combination with baryta. To detect loading, it is sufficient to break off a small piece and note the presence or otherwise of tiny white points or cells; in pure chrome the surface is as smooth as vellum.

BITUMEN.—The purity and quality of bitumen may be recognised by little or no ash remaining after combustion.

CINNABAR.—Adulterations of cinnabar may be discovered by placing a little of the colour in a covered crucible and heating it. The pure portion becomes a sublimate attached to the interior of the lid, while any impurities remain at the bottom of the vessel. The brilliant red cinnabar is untrustworthy, as it contains calcined oxide of lead, which has the effect of darkening oil or varnish; as also the cinnabars containing any sulphur or mercury.—*Translated for* THE BRITISH LITHOGRAPHER *from L'Imprimerie.*

A CURIOUS accident some few weeks ago resulted in a series of experiments by the Army and Navy officers at Newport, U.S.A., by which it has been demonstrated that the pressure exerted by discharging dynamite on an iron plate is sufficient to impress the veins and fine markings of a leaf upon a second plate, placed beneath; the leaf being between them. The markings produced under water are much finer. Also, if a wad of gun cotton be exploded under water upon an iron surface in which words are engraved, the explosive sinks into the iron and causes the intaglio lettering to come into relief.

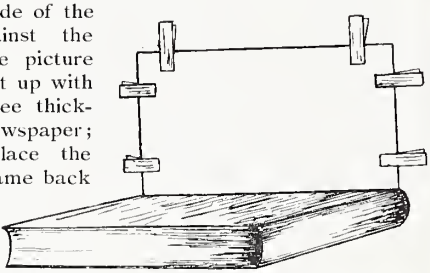
Copying Engravings from Books.

By Edward Manser, Peekskill, N.Y.

The old *lichtpaus,* or Fox-Talbot process, is constantly turning up again in some new and unexpected way. Here is a new application which will be useful to many, amateur and professional alike.

I have long wanted a method for reproducing portraits and engravings from books and magazines without the tedious work of drawing by hand, or the bother of copying with a photographic apparatus. The Fox-Talbot process has come to my relief. All that is required is a piece of clear glass, a printing frame back, half-a-dozen photo clips and a piece of sensitized paper.

If the picture to be copied is the frontispiece of a book, the manner of procedure is as follows: Take the piece of glass and place it at the back of the page on which the engraving is printed, then place the sensitive side of the paper against the face of the picture and back it up with two or three thicknesses of newspaper; on this place the printing frame back (or two pieces of smooth board will do; they should be as nearly as possible the same size as the page of the book), and fasten the whole together by snapping the clips over the edges as in the cut.



This should be placed in the sun to print, the same as an ordinary negative. When it is necessary to examine the print, it can be done by removing the clips from one-half of the back, thus enabling the operator to get a good look at the paper; print deep —it is very unlikely that you will get the negative too deep. When the print is sufficiently done, tone and fix in the usual way and dry between blotters. This is the negative. An indefinite number of prints may be taken from this, by placing it in a printing frame on a piece of glass and proceeding as in ordinary printing.

If the negative after drying should contain reddish spots, rub it over with a tuft of cotton moistened with alcohol.

This process, of course, can only be used when there is no printing on the back of the engraving.—*Anthony's Photographic Bulletin.*

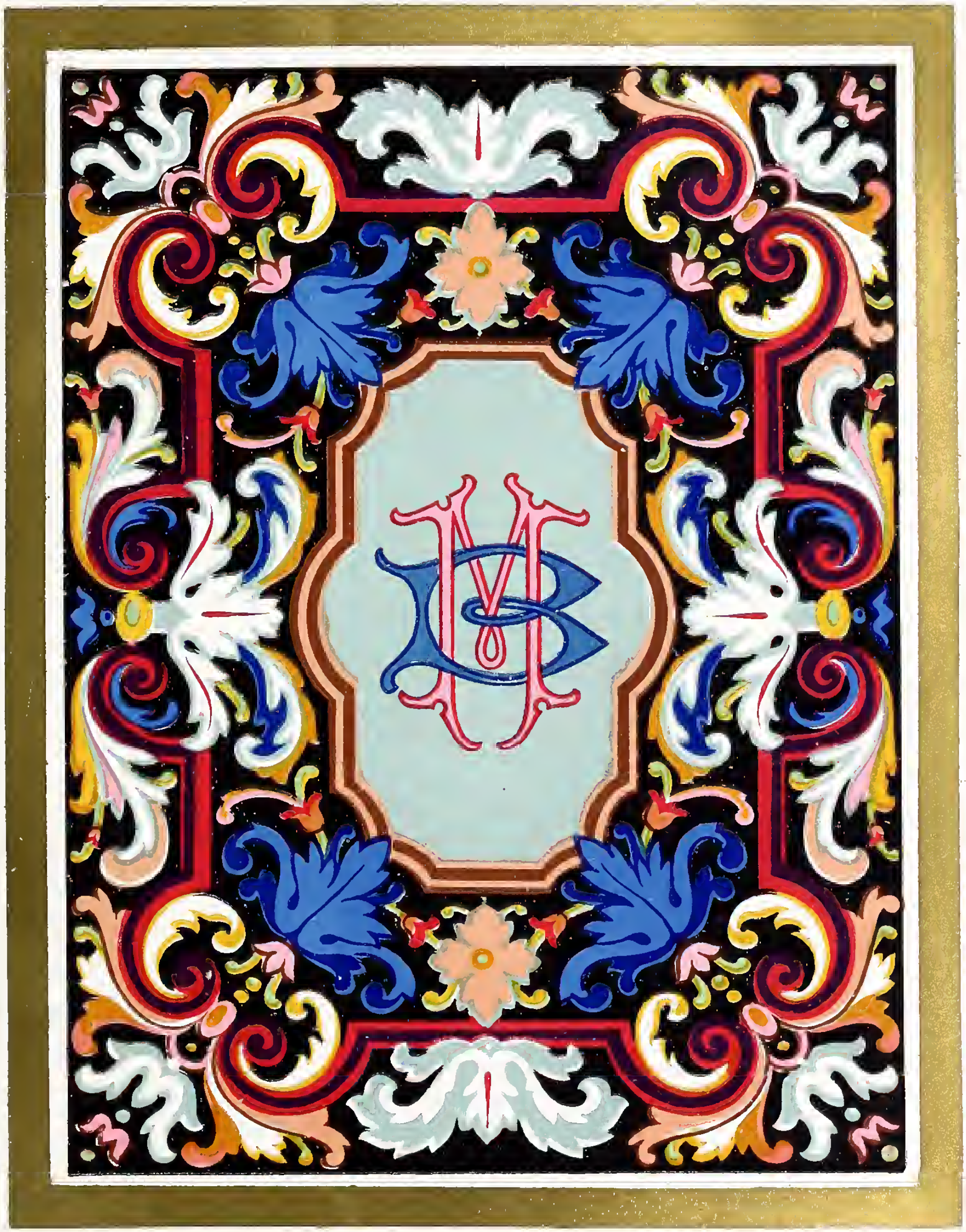
The New Press Printing Company, of Hanley, Staffordshire, seems to be doing well. Our readers will remember its small but sure beginning, and the recent employment of another artist, who, it is understood, will be a permanent addition, necessarily means a considerable increase of business throughout the whole premises.

Zinc for Engravers.

The use of zinc in photo-engraving methods has so increased that the manufacturers and dealers have found the demand for a fine quality of zinc rather beyond the supply. Zinc of perfect density, that is to say, equally hard in all its parts, is an absolute necessity for fine work in photo-engraving, and this quality is not demanded for any other process or use to which zinc is ordinarily put. Consequently the manufacturers have had a demand for a quality of zinc which they were not in the habit of making. Although the demand is considerable, it has not been so concentrated or so sufficiently strong for manufacturers to make any considerable quantity of this zinc, and as a result it is frequently impossible for photo-engravers to procure the quantity of zinc which they need. If zinc is rolled unevenly, or for any reason not properly made, flaws appear which make it necessary in many cases to discard as useless a plate which has been made with great care and at considerable expense. Very frequently these flaws do not show themselves until the plate has been put on the press and under considerable pressure, and then sometimes little scales will chip off always in the most inconvenient places. It is not uncommon for the printer to charge this as a piece of bad work to the photo-engraver.

It will be seen upon reflection that zinc, which is harder in some places than it is in others, will etch unevenly. The plate, with the picture printed on it, is put into acid, and the acid attacks all the exposed parts at the same time, and eats them away so as to leave the relief. If some portions of the plate are softer than others they will of course be eaten away more rapidly, and the result is that the soft spots are usually overdone, and consequently the plate is not good. The effort in the past two years has been to make half-tones on very hard zinc in order to secure lasting qualities for the plates, but it is quite probable that in the immediate future zinc will be made which is tough rather than hard—in other words, more of the consistency of copper, which is a little more elastic than zinc, and which can be prepared with greater certainty, not being so brittle. Imported zinc is much softer and more even in density than any that is made in this country, and it is on this metal that the finest and most delicate line photo-engraving is done. Where plates are to be electrotyped, soft zinc is unquestionably the best, but they are easily damaged, and cannot be run on the press without considerable work.—*Engraver and Printer.*

"Hydrotype" is a new system of printing block letters, invented by Mr. R. Tissington, of Crouch-hill, N., intended to supersede lithography in poster work, especially where white letters are required on a dark ground. Metal matrices one-eighth of an inch in thickness are arranged upon a flat bed of steel or iron, and on this is poured a melted compound, forming a stereotype, which, when mounted, can be worked upon any letterpress machine. The compound is durable, plastic, and readily takes ink, requiring but small pressure to give off a good impression.



Mediæval French Design

LITHOGRAPHED BY A. J. BUNCHER & Cº BIRMINGHAM.

and Printed with Inks made by

MANDER BROTHERS, WOLVERHAMPTON.

Report on the Manchester Lithographic Printing Class,

HELD AT THE TECHNICAL SCHOOL IN THE SESSION 1890-91.

THE class during the past session has been the largest yet registered, and from a practical point of view may be considered most satisfactory. Of the thirty-nine members only two fall into the category of those who do not directly follow some branch of the business. Thirteen students were journeymen printers, nineteen were printers' apprentices. Of the remaining five, two were artists and designers, one a practical photo-lithographer and collotypist, and two were master printers. A feature of the class, which points to the popularity and utility of the course, is presented in the fact that eleven of the students have been pupils in previous years, most of them anxious to secure higher awards and to become more conversant with the technicalities and less known processes, both old and new. In point of attendance the course is above the average: twelve pupils have made over thirty attendances, ten have made between twenty and thirty attendances; leaving seventeen of less than twenty attendances (mostly over fifteen each), the majority of whom have through the vicissitudes of business been prevented attending, and have expressed their regret at their inability to continue the course. One point should be brought prominently under the notice of all employers, and that is, whereas the majority of continental employers consider it a duty to their country to offer every facility to their employés to attend technical institutions; the great bulk of English employers—or the foremen acting on their behalf—seem to drop national claims and think only of their own gains, neglecting the interests of the men who have to compete for an existence with well-trained foreigners. One of the chief obstacles thus thrown in the way is overtime, by which many students who start the session with a will to go through, get their spirits curbed and their ardour broken by having to miss several consecutive lessons, and once the breach is made—especially at the commencement—the course loses interest and is ultimately given up, because there is a feeling that so much has been lost.

This session has been marked by a new departure, in the form of a course of six practical lectures, by a specialist, in the obscure processes of photo-lithography (in line and half-tone), collotype, photo-zinc block process (line and half-tone), and photo-gravure. From the fact that such a course has never been delivered in this country, a strong interest was excited. The course was not only well patronised by the joint printing classes, but by many from other towns as well as Manchester, both employers and artizans, who availed themselves of this very favourable opportunity of seeing the methods by which the most charming prints of the present day are produced. At least one employer paid the expenses of an employé to come from a distant town especially to attend this course.

At the present time the tendency towards specialism is making itself very apparent in lithographic printing. From a synopsis of the work executed in all parts of the country it is shown that firms which produce every class of lithography are very few, and outside London can be counted only by ones and twos in the large centres of the business. On the other hand there are scores of commercial houses where colour work is seldom seen, there are chromo' houses where only one class of chromo-lithography is practised, there are ticket houses where neither the best chromo. nor commercial is executed, and there are pattern printers where almost anything else is foreign. From such facts it is easy to judge that printers, too, become specialists, and when thrown out of employment are not able to readily grasp a situation where an entirely different class of work is executed to that with which they were accustomed. This points to the conviction that technical tuition, where every class of printing receives the fullest attention, is not only a boon, but a necessity to the printing business of the country. In this particular connection, employers and printers' manufacturers should be able to see it is to their advantage to do all in their power to improve and extend the usefulness of technical education. They could supply classes with a few framed samples of the best prints—whether commercial or chromo'. They could send samples of their own high-class printing as supplements to the trade journals, accompanied by descriptions of uncommon processes which, in their positions as employers, they have had opportunities of seeing in other parts or abroad. Makers of materials —inks, machinery, etc.—could, with assistance from master printers, contribute largely towards furnishing with the necessary appliances more practical schools of lithography. Although it is often said that the house of business is the best technical school, yet it can be readily shown that for several reasons an apprentice has neither time, tuition, nor opportunity to make himself acquainted with one iota of the practice, let alone the theory of his business. Some of these reasons are patent to any casual onlooker. See the constant hum-drum speed at which a printing establishment is driven, notice the disinclination of one man to communicate any pet trade secret he thinks he possesses, and finally how apparent is the inability of any employer to train his apprentices. The men themselves are not alive to the result of their reticence on trade matters; it is depleting the whole craft of its original store of knowledge, and at least in the near future it will be necessary to rely upon sound technical instruction in well provided institutions for the production of the all-round man, as well as the specialist, both in their sphere so necessary to the healthy progress of the craft.

In presenting the results of the Examinations it is to be regretted that there are only two classes, though these are fairly well attended :—

Results of the City and Guilds of London Institute's Examination in Lithography.

Manchester.

Honours Examination.

Charles Harrap .. .. 1st Class
and Bronze Medal,
with the Pewterers' Society's Prize of £2.

Arthur Wilkinson .. .. 2nd Class

Ordinary Grade Examination.

Wm. H. Armitage .. .. 1st Class
2nd Prize and Bronze Medal,
with the Pewterers' Society's Prize of £1.

Francis F. Boaler .. .. 1st Class
3rd Prize and Bronze Medal.

Arthur T. Moses .. .. 1st Class
Richard Stansfield .. .. 1st Class
Frank Bowden .. .. 2nd Class
Joseph Knowles .. .. 2nd Class
Herbert Marshall .. .. 2nd Class
Benjamin Shepherd .. .. 2nd Class
Frederick Wheeldon .. .. 2nd Class

The successful candidates are entirely connected with the printing craft. The Honours winners are, respectively, an artist and a photo-mechanical printing process worker. In the Ordinary Grade the 2nd medallist is an apprentice, and the 3rd medallist a journeyman lithographic printer. The other 1st class pupils are a journeyman and an apprentice, and of the 2nd class pupils, four are apprentices and one a journeyman lithographic printer. In 1888 the class in this subject, at the same institution, obtained the 1st (silver) and 2nd (bronze) medals, and in 1890 secured the 1st (silver) and 3rd (bronze) medals.

London.

Ordinary Grade Examination.

Edward Stallybrass .. .. 1st Class
1st Prize and Silver Medal,
with the Pewterers' Society's Prize of £1.

Lonsdale Clarke .. .. 1st Class
Felix Croome .. .. 1st Class
William R. Steerer .. .. 1st Class
Frederick N. Brearley .. .. .. 2nd Class
Andrew Cannadine .. .. 2nd Class
Francis Fisher .. .. .. 2nd Class
Chares W. A. Jaques .. .. 2nd Class
Wallis Heaver .. .. 2nd Class
Harry Palmer .. .. 2nd Class

The Prospectus of the Glasgow International Photographic Exhibition includes a Photo-Mechanical Section in which pictures must be entered in sets of six, and the name of the process distinctly stated. The following are the classes :—(1) Photogravure; (2) Phototype, including Zincotype; (3) Collotype; (4) Woodburytype; (5) Photo-Lithography. A silver and bronze medal will be awarded in each class. The special judges in the Photo-Mechanical Section will be Mr. Robert Blackie, of Messrs. Blackie & Son, Ltd., and Mr. W. B. Blaikie, of Messrs. T. & A. Constable. The Committee are fortunate in securing the services of these gentlemen, who, in their connection with large publishing firms, have acquired a thorough knowledge of photo-mechanical methods of illustration. Mr. Blackie is also widely known as a highly competent art critic. There is every indication that this section will be both large and interesting.

The Derby Lithographic Classes.

The Classes for Technical Instruction in Lithography were first held in the session 1885-6, being examined in connexion with the City and Guilds of London Institute in May, 1886, with the following result:—Nine students were examined; eight of them passed, six of them being 1st class and two 2nd, and the only two bronze medals presented that year by the City and Guilds were obtained by students of the Derby Class.* This shows a very favourable result for this Class, as for the United Kingdom twenty-four sat, sixteen of them passed, being $\frac{2}{3}$, and in Derby alone $\frac{8}{9}$ passed (Ordinary Grade).

*3rd Bronze Medal and £2 .. .. .. R. Ellison.
4th ,, ,, ,, £1 .. .. .. G. Marples.

In 1887, for the United Kingdom, thirty-one were examined; fifteen passed. Derby furnished fourteen students; ten passed.

Ordinary Grade—1st Class, one; 2nd Class, five.
Honours ,, ,, ,, ,, four.

In 1888, for the United Kingdom, twenty-nine were examined; sixteen passed. Derby again furnished fourteen students; ten passed.

Ordinary Grade—1st Class, one; 2nd Class, four.
Honours ,, ,, three; ,, two.

William Clarke, in addition to his 1st Class Honours Grade Certificate, obtained the Silver Medal and £5; this being the first time this prize had been granted in Lithography.

Owing to the success of the students, the Classes have not been worked systematically for two years, there not being a sufficient number of workers in Derby to form another class, but at the beginning of this year a course of instruction, consisting of twelve lectures, was given by request, to the journeymen and apprentices in Messrs. Bemrose & Sons' works.

The Classes were open to journeymen and apprentices from any of the firms in Derby, Messrs. Bemrose kindly providing room, paper, pencils, etc., so that no expense whatever was charged to the students (twenty-six lectures in each grade).

Invitations are being sent out to all the master printers in the town for them to take the matter up and see if any of their employés will consent to join a class; if sufficient names be obtained the Sessions work will commence in October.—S. D. H.

Liverpool Technical Classes.

We learn from Mr. J. Honeyman, the able and energetic teacher of the classes at the School of Science and Technology, that the Corporation of Liverpool have made a grant of £500 to that institution, and that a portion of this sum has been allotted to him to furnish the necessary plant for the practical teaching of lithography, and a similar amount to Mr. Gartin for typographic materials. The latter classes opened on September 30th, and for lithography on October 1st. Mr. Honeyman has done good service in the past three years in his persistent advocacy of the claims of Liverpool artizans for thorough technical education, and is to be congratulated on the success of his efforts.

Examination in Lithography, City and Guilds of London Institute, 1891.

QUESTIONS WORKED OUT.

THE plan adopted for the past three years by our spirited contemporary, THE BRITISH PRINTER, of working out the Questions set in Letterpress Printing at these Examinations has induced us to follow the same course with regard to Lithographic Question Papers. Our assistant-editor, Mr. CHAS. HARRAP, will undertake this duty, and will be assisted when required by other competent specialists on the various allied processes. The answers will thus form a fund of valuable practical instruction for apprentices and young journeymen, useful in their daily work as well as in the class-room and at the examinations. Teachers of classes in Lithography are invited to forward their Class Examination Papers to the Editor.

ORDINARY GRADE.

QUESTION I.—What is the principal chemical compound found in the stone fit for lithography, and how would you roughly test a sample of stone?

ANSWER: The main constituent of lithographic stone is calcium carbonate—carbonate of lime—a substance which is also the principal component of all limestone, chalk, marble, coral, and shells. The composition of these latter substances is so closely allied to lithographic stone that if a piece of the latter were given to a chemist unacquainted with the appearance and texture of this particular stone, he would in all probability call it ordinary limestone. A rough test can be easily given to prove that the stone is a carbonate by putting any acid upon it, the results being the formation of a salt, of water, and the evolution in bubbles of carbonic acid gas (Co_2). To prove that the stone is actually a carbonate *of lime*, it is necessary to heat a piece in a lamp flame, and if it be lime the stone gives a red coloration.

QUESTION II.—What is the chemical composition of Prussian Blue, Brunswick Green, and Flake White respectively?

ANSWER: PRUSSIAN BLUE is the ferrocyanide of iron $[Fe_7(CN)_{18} + 9H_2O]$ and is obtained by adding the yellow prussiate of potash to ferric chloride. When pure it is known also as Paris blue, and when impure as mineral blue. It is often adulterated with alumina, gypsum, chalk, and starch.

BRUNSWICK GREEN is a pale bluish green, insoluble oxychloride of copper $[Cu\,Cl_2\,3\,Cu\,O + 4\,H_2\,O]$, produced by exposing fine copper scraps to the action of hydrochloric acid. The name Brunswick is used because it was first prepared there.

FLAKE WHITE is an oxidized carbonate of lead, or lead carbonate and lead hydrate $[2\,PbCO_3 + PbH_2O_2]$. Its general appearance is in flakes or scales. It is more liable to secondary actions on exposure to air, than is zinc white.

QUESTION III.—What proportion of varnish, and what kind, would you mix with a three-shilling black ink, to run 800 impressions per hour on a demy machine when the thermometer stands at 70° F.?

ANSWER: In the winter a room kept at 60° F. is considered to be quite warm enough for comfortable working. An air at 70° F would be considered tolerably warm and would cause the strongest varnish to be nearly like thin varnish when the heat is 50° to 55° F. Again, at 70° F. a can black would be somewhat moist and would not require much varnish to be workable, although a 3/- black would not be so visibly affected. The speed of *800 impressions per hour* will necessitate the ink not being too strong, lest the work is badly fed and ultimately stripped from the stone. To meet all these, almost impossible, circumstances about 3-oz. to 4-oz. of strong varnish and 1-oz. of medium varnish to the pound of black will be ample.

QUESTION IV.—Describe your favourite way of etching and rolling up a delicate chalk drawing on stone.

ANSWER: Only one method of etching a chalk drawing seems to recommend itself as the most efficient and capable of every requisite variation in treatment for all kinds of chalk work upon grained stone. The method referred to is that in which nitric acid is added in small quantity to clear gum solution. If it be a delicate drawing the acid must be in a very small proportion—just sufficient to cause a *very slight* bubbling after being on the stone a moment. The method of applying this etch is with a flat camel hair brush, and if kept weak, may be brushed over the stone evenly two or three times, after which the brushing must be carefully confined to those parts where there is a greater body of chalk. Experience can alone decide when the application of the etch should be discontinued. The etch is allowed to dry, and after standing an hour or two, it may be sponged with clean cold water to remove the gum. At this stage, considerable care is required to remove the chalk and replace it with ink. To wash it out with turpentine would mean permanently impoverishing the work. It is necessary to roll up (with nap roller) in a medium ink, not too fully, and take an impression on a thin paper. By repeating this process, the chalk is gently removed and gradually replaced by the ink, which is evidenced by the impressions becoming blacker and blacker until the necessary depth is attained.

QUESTION V.—In rolling up and proving an ink drawing on stone would you commence by etching it? If so, why so? If not, why not?

ANSWER: If the drawing contained large heavy bodies of ink in ruled borders, or large surfaces filled in with thick Lemercier's ink, then it would be safest to etch those parts only with nitric acid and gum solution, rather weak. The reason being, that the amount of soap in such masses would cause

spreading of the ink as soon as water was applied. But, in the greatest number of ink drawings such a precaution is unnecessary; the ink is usually thin and fine and an etch would materially destroy the work.

QUESTION VI.—In printing a colour job containing Prussian blue, crimson lake, grass green, chrome yellow, grey tint, flesh tint, and dark brown, what order would you prefer to give to the succession of colours, and why would you adopt that order?

ANSWER: There are several circumstanees whieh govern the order of printing. Firstly, the opaque colours should be put on before transparent ones, and secondly what effects have to be obtained by overlying colours. On the supposition that there are not any secondary effects in view, the order of printing should be chrome yellow first, to give a facing upon which other colours will more readily print, and because it is the most opaque of the series given. It is immaterial whether the flesh or green is printed next. Say green second, flesh third, as both are to a degree opaque, and are usually used over large areas. Crimson lake can be put on fourth, Prussian blue fifth, dark brown sixth, and the grey tint last with a view to toning and blending the whole print.

QUESTION VII.—What are the sizes in inches of "royal drawing or writing," "royal printing," "imperial drawing," "imperial printing," "demy drawing," and "demy printing" papers?

ANSWER: The following are the sizes of the papers named:—

		Other Authorities.
Royal drawing or writing	19-in. × 24-in.	12-in. × 23½-in.
Royal printing	20 ,, × 25 ,,	.. ..
Imperial drawing	22 ,, × 30 ,,	22 ,, × 32 ,,
Imperial printing	22 ,, × 30 ,,	.. ..
Demy drawing	15½ ,, × 20 ,,	16 ,, × 20 ,, 16 ,, × 21 ,,
Demy printing	17¾ ,, × 22½ ,,	17½ ,, × 22½ ,,

Unfortunately, the makers of paper have not all the same gauges, and writers upon the subject have considerable variations to deal with.

QUESTION VIII.—How would you make an ink for drawing upon ordinary writing paper to be transferred to stone?

ANSWER: An old German recipe contains the following ingredients:—Shellac 12-ozs., mastic 4-ozs., tallow 1-oz., bicarbonate of soda 1-oz., lampblack 1-oz. These materials are mixed with water, then boiled until well dissolved; the boiling is continued until the water has evaporated. Water is added, and the dried matter is again dissolved; after which it is well filtered and preserved in corked bottles. In use, it can be thinned, if necessary, with water.

QUESTION IX.—Describe how you would etch, roll up, and prove a drawing upon a grained zine plate.

ANSWER: Zinc, unlike polished stone, does not readily form the necessary insoluble compound requisite for printing from; therefore, whether a drawing be made in ink or chalk upon grained zinc, the first step to prepare for printing is to cause a firmer combination between the ink (or chalk) and zinc. This is effected by brushing evenly over the whole work and plate a solution of gum and acid. The etching solution is prepared by extracting gallic acid from gall-nuts. Four ounces gall-nuts steeped in three quarts of water for a day, then boiled and strained, will give the gallic acid solution, ¾-pint of which, with ¼-pint of thick gum and 20 or 30 drops of phosphoric acid well mixed, make the etching solution. Having brushed this solution all over the plate, it is allowed to dry. After standing an hour or so, the plate is gently washed with turpentine, so as not to disturb the gum. The plate is then rolled in black all over. Having put on an even layer of ink, water is sprinkled on the plate and the whole is rolled briskly. This removes the ink from such parts that have not been drawn upon, and ultimately the work eomes out clearly, ready to be proved from. Care has to be taken in proving, to gradually work the ink well into the plate by the use of an ink of medium strength.

QUESTION X.—Describe the difference between a litho. crayon and stick of litho. ink, and say how each is used?

ANSWER: The main difference between the crayon and the ink is the varying proportion of their ingredients. In the ink, tallow and shellac bear a large proportion in the mixture; whilst in the crayon, tallow and shellac need not be used at all, and in their places may be used a small proportion of spermaceti and a large proportion of soap. A comparison of two recipes shews the difference at a glance, thus: Ink—4-ozs. each of tallow, wax, soap, and shellac, with black to suit; Crayon—soap 6-ozs., wax 4-ozs., spermaceti 1-oz., and black 2-ozs.

In use, the ink is rubbed from the stick, in a palette. When sufficient has been rubbed on, water is added slowly, and the ink mixed with the water by rubbing with the finger. Ink thus prepared is used with pen or brush. The crayon, being in round sticks, is sharpened and worked similarly to a pencil.

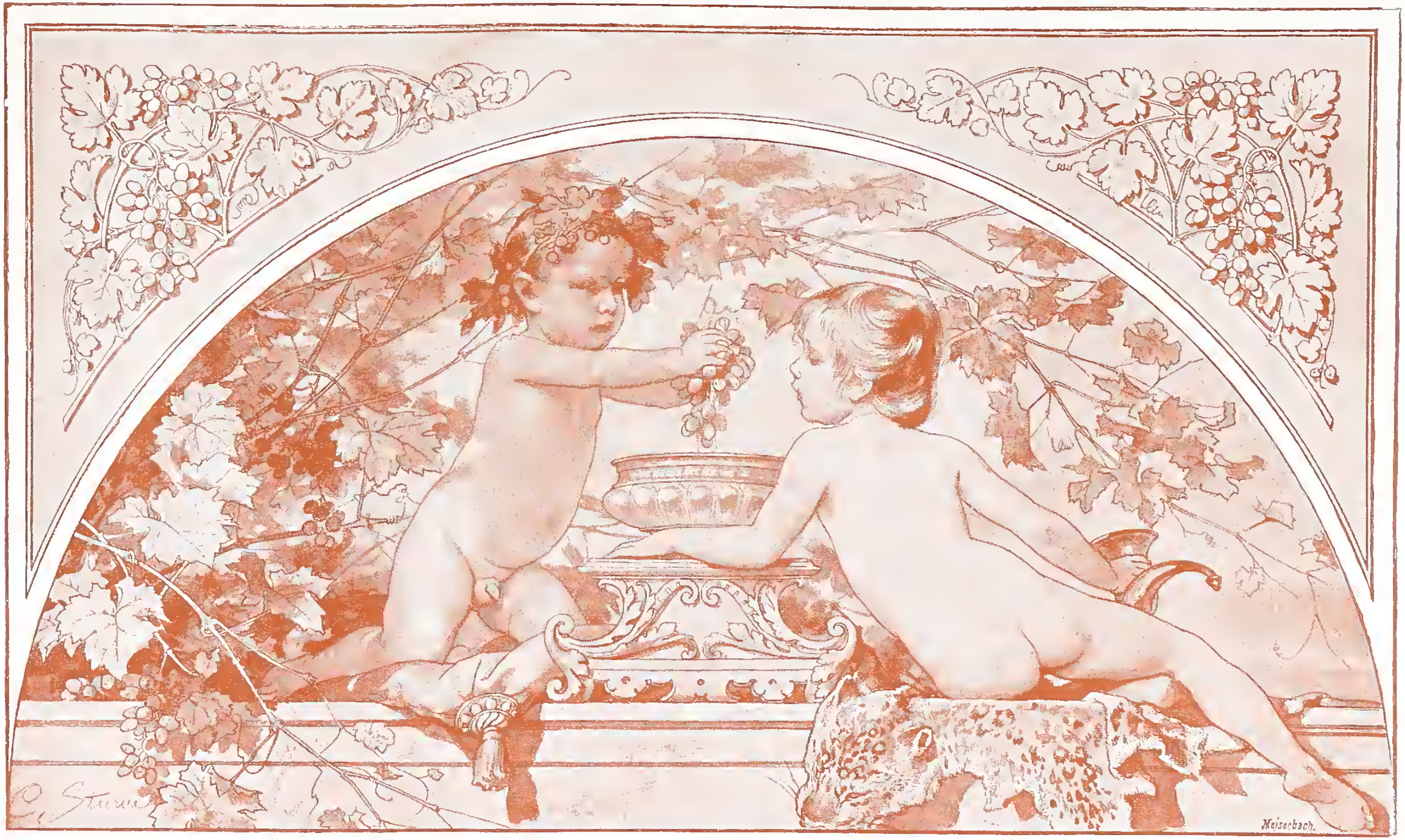
QUESTION XI.—What is your experience of the zinc plate substitutes for stone, now in the market?

ANSWER: From experience and hearsay it may be said that these plates are not taken to kindly; probably because they are an innovation upon old customs and present difficulties which have not yet been mastered. But it seems very probable that for some purposes these plates, or some modification of them, will be used to a very great extent in a not far distant future. There are some advantages in these plates whieh cannot be readily overlooked. Some of them give impressions equal to many copperplate impressions, and the printing process does not require the same careful management that stone does. For originals, they are excellent; but for drawings requiring alteration or for ordinary use to replace stones, they are unfit.

QUESTION XII.—Describe the method of graining a zinc plate.

ANSWER: There have been many different methods tried to effect the graining of zinc in a more expeditious manner, but none seem to accomplish the process as well as the method applied for graining stone. A new polished plate is covered with sand sifted through a

Supplement to "The British Lithographer."



"THE VINE." BY G. STURM.

SPECIMEN OF PLATES IN "THE ART DECORATOR"—REDUCED FROM PHOTO-PRINT.

LONDON: PUBLISHED BY THE ELECTROTYPE COMPANY, 80 FLEET STREET, E.C.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

&C.R. LTD.

fine sieve ; a few drops of water are sprinkled on the sand ; then, with a stone muller having a circular flat face and the edges well rounded, the sand is ground against the zinc by an onward rotary motion. This process is pursued up and down the plate until a fine regular grain has been worked out of the surface. The plate is then dried rapidly, preferably by heat to prevent oxidation, and is now ready to be drawn upon.

Honours Grade.

QUESTION I.—Describe a mode of preparing a photo-litho. transfer paper, and say how it is to be used.

ANSWER : Of the several ways of preparing a paper there is one which seems to effect the purpose with the greatest certainty, and is capable of manipulation by any painstaking lithographer. The operation divides itself into two distinct parts : (1) the laying of an even foundation upon the uneven paper, and (2) sensitising this layer to receive the photographic print.

In the first process, a solution of gelatine (3-ozs.), sugar ($\frac{1}{4}$-oz.), and water (40-ozs.) is carefully prepared, to which may be added a few drops of chrome-alum solution (20-grain sol.), and the whole is well strained into a clean hot dish, kept warm by standing in hot water. Upon this solution a well chosen fine wove paper is drawn across until an even layer is left upon it. It may have to be drawn across several times to secure a good result. Then pin the sheets up to dry. When dry, coat again and dry. The paper should then be well calendered, and put away for future use. When required, sufficient paper for the work in hand is taken from the stock, and in the second process is sensitized. A solution of the white of 2 eggs, water (2-ozs.), and bichromate of ammonia (1-oz.) is carefully mixed and strained, then placed in a flat dish. The paper, having the gelatine layer upon it, is floated for a few minutes upon this sensitizing solution, and dried. The drying is a delicate matter, and, like the sensitizing, must be carried on in a room where the window is entirely covered with a yellow fabric or paper to exclude pure white light. The best method for drying is to have a box mounted upon an iron tank into which water can be put, and with a safety valve for the escape of steam. The box should be of sufficient size to hold double-royal paper. The lower portion of the box requires a few air holes through it, and the same at the top. Inside the box, on the sides near the top should be two narrow shelves. The sensitized paper is pinned on rods, and the ends of the rods are placed upon the shelves in the box, the door closed, and the paper dried at a temperature not exceeding 80° F. A window in the box, with a thermometer against it, affords a ready means of ascertaining the heat within, and a gas jet below the tank can be regulated to keep the water at an even temperature. The dried paper may be kept in folios, or in covered stone jars, and is ready for use.

Before exposing the paper under the negative it should be rolled. The exposure having been made, the paper, with a light-brown copy of the image photographed upon it, is clipped upon a board, and rolled up in good retransfer ink by means of a glue roller. The rolling should be in one direction only, *i.e.*, from the clipped edge, and is continued until the turpentine with which the ink is thinned has evaporated and causes the roller to adhere slightly to the paper. The paper should have a very thin film of ink upon it, and the image should show through distinctly. After lying exposed a few minutes, the print is placed in clean cold water and allowed to soak for a quarter of an hour or more. It is then placed on a flat smooth surface, and with a tuft of cotton wool the surface of the print is gently rubbed until the ink is cleared away from the whites of the picture. The print is again immersed in clean cold water and soaked. It is then rinsed under a tap and put between blotting sheets, removed and pinned out to dry. When dry, it is transferred to stone by the warm stone process.

QUESTION II.—Describe the respective uses of tallow, soap, wax, and shellac in lithographic printing ink.

ANSWER : For the operation of drawing upon stone for printing purposes it is necessary to use a greasy substance, but it would be impossible to work an oil or fat alone in the brush or pen, and as a non-drying fat is essential, it alone could not be printed from without smashing. An ink, then, requires a basis of grease such as tallow, hardened by a firmer grease such as wax. These two substances would still have a non-drying tendency, to remedy which the resinous material, shellac, is added. The tallow and wax will melt up together fairly well, but to incorporate the shellac it is necessary to introduce a solvent, such as soap, which not only causes the shellac to combine with the wax and tallow, but produces a thorough union of all three ingredients, and the black to form the lithographic draughtsman's ink.

QUESTION III.—What is the mode of preparing a leather tympan for use ?

ANSWER : Ordinary leather, procured in sheets from the merchant, although previously prepared, has a tendency to become harsh and dry by constant pressure such as is exerted in the printing press. To work with such leather would be equivalent to using a board and would give smashed prints. To obviate this, the leather is well rubbed with a non-drying grease—preferably "prepared" lard—which is well worked into the pores of the skin and enables it to retain its original elasticity. Having secured that result, means are taken to insure absence of friction between the scraper and leather by smearing finely powdered black lead on the upper surface of the tympan. These materials are worked into the leather by running it through repeatedly.

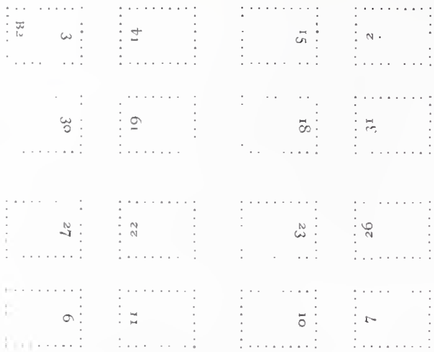
QUESTION IV.—If a drawing be made to a scale of five-eighths, what will its scale be when reduced three-fourths ?

ANSWER : If any line of the original be 12 inches long, then in the first drawing such a line will be represented by a line $\frac{5}{8}$ of 12 inches, or $7\frac{1}{2}$ inches. Such a line in the reduction would be only one quarter of the length it was in the first drawing. Thus :—

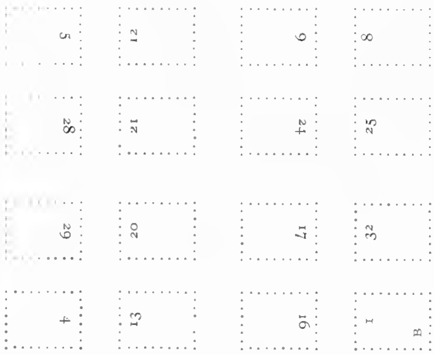
$$\tfrac{1}{4} \text{ of } 7\tfrac{1}{2} = \tfrac{1}{4} \text{ of } \tfrac{15}{2} = \tfrac{15}{8}, \text{ or } 1\tfrac{7}{8} \text{ inches.}$$

The original drawing of $7\frac{1}{2}$ inches to the foot (or five-eighth scale) will, by reduction, become a drawing of $1\frac{7}{8}$ inches to the foot (or a scale of $\frac{5}{32}$).

QUESTION V.—Show how to arrange thirty-two (32) pages to be printed from two stones.



INNER.



OUTER.

QUESTION VI.—Describe any method you may know of photographing on wood.

ANSWER: One of the simplest methods by which the best results are obtained is to prepare a negative by the wet collodion process; which, after fixing, is immersed in a weak solution of nitric acid. By this means the film is floated off the glass, and at that stage a piece of "Sawyer's temporary support" is carefully slipped under the film. The film is removed from the acid solution and placed upon the wood block, previously gummed and is pressed on by a squegee. The "support" is then removed and the block flooded with methylated spirit. The film becomes firmly attached to the wood block, and can now be used as a tracing. In the engraving operation the film offers little or no resistance to the tool.

QUESTION VII.—How is the mechanical ruling of truly parallel and equi-distant lines accomplished on stones and metal plates?

ANSWER: To effect this operation it is necessary to have some mechanical means of repeating the ordinary hand method of ruling a series of lines. In the first place, a firm iron bed is bored in convenient places to allow of inserting a number of clamps, between which a plate can be rigidly held. Across this bed-plate is arranged a bridge which, by a ratchet action on one side, can be moved along racks at each side of the table (bed-plate). This ratchet action is regulated by a movable pin placed in a semicircular graduated band, and by this means the bridge is moved bodily at regular intervals, across the "plate," thereby securing that the lines shall be equi-distant. The bridge carries in its length a slide, upon which is accurately fitted a carrier. From the carrier the tool is carried downwards, and terminates in a diamond point. The slide motion allows the carrier to draw the diamond point directly across the plate, thereby removing the "ground" from the plate and putting an initial scratch upon it. By the ratchet action the bridge, slide, and carrier are moved a short distance along, and the tool is drawn across the plate again, making a second line perfectly parallel to the first. Having drawn a sufficient number of the lines, the ends are blocked out with "grounding," so that the lines only cover the space required. To finally finish the lines, an etch of nitric acid is run over the plate and the lines are bitten in. To make a really first-class piece of work, the lines may be finished with the graver.

QUESTION VIII.—Describe the process of mezzotint engraving upon copper, and sketch two of the tools used.

ANSWER: In this old high-class process of producing prints, the copper used is so abraided by a file-like tool as to produce an even surface of fine grain. Such a plate, inked in, would give an even velvety print not quite solid black. Upon this roughened plate the sketch is worked out, and the mezzotinter, with a burnisher, gradually smoothes the roughened plate wherever he requires the lights to appear. In such places where absolute white is required, the roughened face is smoothed to perfect flatness. The variety of tone which can thus be secured is well exemplified in the grand old portraits with their background of soft black, whilst the figure, etc. are worked out in all shades up to absolute white.

QUESTION IX.—Describe how to produce the cardboard used for making drawings when they imitate the Meisenbach process.

ANSWER: In preparing cardboards or transfer papers with any special grain upon the surface, recourse is had to absolutely impressing the granulation either upon the board in course of manufacture or upon an enamel surface subsequently put upon the board or paper. Thus by preparing a transfer paper with a good layer of firm composition on its face, and passing it through a press with a grained stone or plate in contact, a clear impression of the graining is left upon the composition. In the ordinary lithographic and typographic processes, embossing is done in the press as a printing. Any card of sufficient substance or enamel card will by pressure take the impress of a fine wire gauze and produce a surface, which, when worked upon, will give the appearance of a Meisenbach drawing or print. Instead of gauze, a plate finely engraved with square dots will give an even finer surface and will more resemble the same process.

QUESTION X.—Describe the collodion process of making a photographic negative.

ANSWER: The photographic negative in this wet process has to be produced on glass: and it is highly important that the glass should be a good quality of flatted crown, and for use, absolutely clean. The cleaned glass is first edged with a thin film of india-rubber dissolved in benzole, put on with a camel-hair brush, to the width of only ⅛-inch. The plates are then covered with a thin film of albumen—so thin, in fact, that, when dry, it cannot be detected. The albumen solution is prepared with the white of one egg, 40-ozs. of water, and 10 drops of liquor ammonia. Plates thus coated are put away with the coated faces all one way, so that it is easier to determine which is the coated face, and can be stored for months. When required for immediate use, a solution of collodion is poured upon the albumenized glass, it is then sensitized in the silver bath and exposed in the camera. The collodion itself is prepared by mixing cellodine (1½ cakes), methylated spirit (36-ozs.), and methylated ether (40-ozs.): to this is added an iodizer, which completes the collodion solution. The iodizer is a mixture of bromide of zinc (150-grs.), iodide of zinc (350-grs.), methylated spirits (10-ozs.). A plate which has received the collodion solution is next sensitized in the silver bath, consisting of nitrate of silver (6-ozs.) in (10-ozs.) water, iodized collodion (10 drops), to which, after well mixing, is added water (70-ozs.). The whole to be well filtered. Finally, add 20 drops of nitric acid, and allow it to stand for a night.

The sensitized plate is then exposed; the photograph is taken, and the plate returned to the dark room, where the plate is at once "washed" over with a developer prepared with saturated solution of iron (10-oz.), acetic acid (4-ozs.), water (70-ozs.), and methylated spirit (from 1 to 5-ozs., according to the quality of the silver bath). This developer is kept upon the plate and rocked to and fro over it until the image comes out. The plate is well washed and examined, either to proceed with it or reject it. Having passed the plate, it should be rinsed under the water tap and fixed in a solution of cyanide of potassium (3-ozs.) and water (20-ozs.). Then washed, back and front, and put into a solution of chloride of ammonium (2-ozs.) and water (80-ozs.), to which is added bichloride of mercury (2-ozs.), which bleaches the film, and is followed by immersion in liquor ammonia (5-ozs.) and water (20-ozs.), by which the film is turned jet black. The negative is finally washed well, dried, and varnished. The negative is then complete and may be printed from.

A New Steel-Plate Printing Machine.

THERE is in Paris, in the office of M. J. Voirin, a new machine for printing line engravings. Plate work needs careful wiping, and it is performed in this machine by means of a rotary wiper, on Larivière's system. Four hundred sheets an hour can be printed, and a remarkably good quality of work is secured. It is reported to be working most satisfactorily.

Preservation of Zinc Plates.

PRINTERS sometimes find zinc plates, after being laid by for some time, much damaged by damp. So sensitive are the plates to moisture that a single drop left on them by inadvertence will completely spoil them. A very effective though simple way to preserve them for an indefinite time is to wipe them thoroughly dry with a clean cloth, and lightly smear them with mutton fat; they may then be stored away for any length of time without fear, and the fat can easily be removed by brushing the plate over with turpentine. Electrotypes may be effectually preserved from the attack of verdigris by treating them in the same manner. It has repeatedly been asserted that zinc plates cannot be washed with oil of turpentine when they are about to be rolled up with fresh ink, and this assertion has been supported by certain chemical reasons; for instance, that the zinc soap which forms the design is dissolved by the oil of turpentine. But the practical experience of a correspondent contradicts this assertion completely, and if it were based upon facts it would be simply impossible to print colours from zinc plates. Zinc plates may be washed with oil of turpentine just as the lithographic stone, but it is advisable to use the oil mixed in equal parts in the bottle, or to employ spirits of turpentine, benzine, or even kerosene. If to this is added a thin solution of gum, the design will not suffer in the least, and the plate will be kept clean. Zinc plates prepared after this method produce absolutely precise impressions, and the whole process is not only extremely simple, but absolutely safe as to results.

New Process of Making Printing Plates.

MR. FR. WINTERHOFF, of Cologne, has patented a process of making glass printing plates for typographic and lithographic purposes, which will be of interest to photo-lithographers. It consists in the following:—A glass plate is coated with a sensitive solution of asphaltum, or with bichromated gelatine, and dried; a print is then taken from any printing plate—from a negative, for instance—on a well-prepared transfer paper, which is then transferred to the glass plate provided with the sensitive layer. The transfer paper is then removed, and the transferred print on the glass plate dusted with metallic powder—for instance, with bronze or leaf metal—when the plate is well cleaned. It is then exposed to sunlight for about half-an-hour, and washed with turpentine, whieh dissolves the unexposed parts of the layer, whilst it leaves unaltered those portions which have been exposed to light. The plate is then etched very deeply with fluoric acid for about half-an-hour, rinsed, and cleaned, when it may be used as a printing plate. From this plate, transfers may be made at any time, to be transferred to stone or to zinc, or the plate may itself be employed directly as a printing plate without fear of wear and tear. These plates afford a very practical substitute for the expensive lithographic stones or zinc plates.

Programme of Technical Examinations,

SESSION 1891-92.

We have received the programme of the technological examinations for the session 1891-92 in connection with the City and Guilds of London Institute. From it we extract the following particulars relating to

LITHOGRAPHY

AND ALLIED PRINTING PROCESSES.

I. SYLLABUS.—The Examination will include questions founded on such subjects as the following:—

ORDINARY GRADE.

1.—Chemical and physical properties of the materials capable of being employed as printing surfaces; lithographic stone, compositions, metal plates; preparation and grinding of the stones; polishing and graining; treatment of zinc plates and a consideration of those qualities of zinc which are unsuitable for use as printing plates.

2.—Lithographic writing inks and crayons; writing and drawing on the stone; various kinds of tint and stipple; gumming, inking, etching, and other manipulations incidental to getting the stone into printing order; printing inks, the pigments employed and their permanency under the action of light and time; varnishes, their manufacture, varying consistencies, and uses; rollers for lithography; the operation of bringing a leather roller into a fit condition for work; circumstances which render a hard or soft roller specially suitable; the mixing and distribution of the inks, and the inking of the stone for printing.

3.—Use of hand presses and of power-driven machines; various qualities of paper suited for receiving the impression; gradual degradation of the image during printing, either from an extension of the ink lines or from their obliteration; signs of coming mischief in either case; remedies; effects of temperature on the consistency of the ink, and influence of pressure and speed during the operation of inking.

4.—Transfers, either written or printed; ordinary autograph work; transfers on grained papers; inks for transfer work; preservation of transfers; transferring fresh matter to a stone already in use.

5.—Colour work; means of insuring register; overlaying colours; bronzes and dusting colours; lithography on glass, metal, wood, enamelled card, silk, and other materials; engraving on the stone, etching stone or zinc into relief.

HONOURS GRADE.

The Examination for Honours will consist of advanced questions in the preceding subjects, and will include the following additional subjects:—

PLATE PRINTING.—Preparation and surfacing of steel and copper plates; the various methods of engraving and the tools employed; inks, burnt oils, and varnishes; grinding of the colour; inking of the plate and the printing operation; presses and machines; probable future of engraved plate printing by machines; pulling of transfers for use by the lithographer; papers suited for plate printing; alterations; various processes of etching; laying of grounds; reproduction of plates by the electrotype process; nickel and steel facing.

OTHER PRINTING PROCESSES.—Autographic printing methods, such as those which employ surfaces of gelatine and glycerine, or glue and molasses, known as the hectograph, chromograph, &c., and the stencil processes, as the horograph, typograph, cyclostyle, &c.; permanency of autographic printing by the various processes; methods of printing founded on the partial amalgamation of metal plates; photo-mechanical printing methods, such as collotype, Woodbury-type, Stannotype, photolithography, and other allied methods of printing; phototypic blocks, by various processes; the Pretsch process, as applied to the production of deep plates or type blocks, from negatives after nature.

II. FULL TECHNOLOGICAL CERTIFICATE.—A Provisional Certificate will be granted on the results of the above examination. For the full Technological Certificate in the Ordinary Grade, the candidate who is not otherwise qualified (see Rule 37) will also be required to have passed the Science and Art Department's Examination in the Elementary stage at least; and for the full Certificate in the Honours Grade, in the Advanced stage at least, in *two* of the following science subjects:—

II. Machine Construction and Drawing.
VI. Theoretical Mechanics.
VII. Applied Mechanics.
IX. Magnetism and Electricity.
X. Inorganic Chemistry.
XIX. Metallurgy.

III. WORKS OF REFERENCE:—"Zincography as practised in connection with Letterpress Printing," translated from the German of J. Bock, by E. Menken (Wyman & Sons, Great Queen-street, London). "L'Imprimeur Lithographe," by M. Knecht; one vol., with atlas; price 5 frs. (Roret, 12 rue Hautefeuille, Paris). "Instruction in Lithography," by C. Straker; price 6/6 (Winstone, 100 Shoe-lane, London). Grammar of Lithography," by W. D. Richmond; price 5/- (Wyman). "Colour and Colour Printing as applied to Lithography," by W. D. Richmond; price 5/- (Wyman). "Handbuch über das Lichtdruck," by Julius Allgeyer; price 6 marks (Karl Scholtze, Leipzig, 1881). "Guide to Art Illustration," by J. S. Hodson (Sampson Low, 1884). "Photo. Engraving on Zinc and Copper in line and half-tone, and Photolithography" (England Brothers).

THE LITHOGRAPHIC DEPARTMENT of the immense U. S. Government Printing Office at Washington employs fourteen machines and presses of various kinds, and is in charge of a chief lithographic printer and nine assistants. Here all maps, plans, &c., for government publications, as well as stamps for certain revenue purposes, post cards, &c., are executed, by photolithography as well as by ordinary lithography, and all inks used are made on the premises. Upwards of 260 large stones are in constant use.

Specimens from "Designs for Graphic Artists."

London: Published by The Electrotype Company, 80 Fleet Street, E.C.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

·&C.R.Ltd·

Trades' Congress, 1891.

Merchandise Marks Act, 1876.

The largest Trades' Congress that ever met has concluded its business, and the work it has done will always be looked upon as some of the most sincere decisions of the working classes. Under the admirable chairmanship of Mr. T. Burt, M.P., the discussions were carried on in a genuine manner. Subjects of importance were dwelt upon at length, and the ultimate decisions may be considered as the outcome of mature consideration rather than any attempt to obtain what has been known in the past as a "catch vote." The printing and kindred businesses were represented by twenty-three delegates—mainly typographical representatives. The lithographic printers claimed two, the artists one, the bookbinders three, whilst the warehousemen and cutters had sent one delegate.

Of business directly affecting the printing craft there was not a single item discussed—not because there is not anything to be discussed, but, because matters of more importance occupied the time. The great questions of the day, the National Eight Hours and the Miners' Eight Hours Bills, the Limit of Age for Half-timers, and more extensive Factory Inspection came in for a large amount of consideration, and the decisions arrived at were of a progressive nature. The conclusion upon the National Eight Hours Bill was one of the most sober and most practicable yet recorded, and its purport may be briefly stated that an enactment be made to enforce a "legal eight hours day" with a clause—a permissive clause—by which an organization connected with any trade can, by the vote of the majority of its members, make such trade exempt from the enactment. There is a very strong feeling against overtime, and it is somewhat curious to notice the safeguards which societies as well as employers use to prevent systematic overtime. The great aim for reduction of hours has two bearings—in one direction it secures greater leisure for the employed, which it is left to their good sense to know how to profitably use, and in the other direction tends to employ more men, this latter having a second bearing, tending to minimize the possibility of overtime.

Not only are printers complaining about their ill-ventilated workrooms, but the cry is coming with far greater weight from members of other trades, and although there is a strong desire to have more practical working men and women inspectors, yet the fact is not lost sight of that efficient inspectors must be duly qualified men. It was further urged that such qualified men can be found in the ranks of the working class; and that the disabilities against them—such as the necessity of having nominations backed with the names of several members of parliament—should be removed, in order that such men should be better able to compete at the qualifying examinations.

Amongst the subjects directly connected with printing, there are matters arising from copyright and importation of foreign workmanship, which require to be dealt with. The delegates of the printing craft were not unmindful of these points, and proposals were put into the hands of the Standing Orders Committee. But the prolonged discussions on the first items of the programme made it impossible to touch at least forty proposals handed in.

The importation of foreign workmanship, in some cases, does not fall under any section of the Merchandise Marks Act. It is well known that annually large quantities of booklets and cards—Christmas, New Year and birthday—arrive in this country from abroad; and it has become quite familiar to see the imprint on such goods, which clearly shows that the work has been "Designed in England and printed in Germany." Against this there is nothing to complain, not even the importation of foreign goods. It is certainly a pity that the work is not printed in this country; but rather than be without the beautiful work thus imported, especially that which comes from Ernest Nister's, it is reasonable to accept it, though of foreign production. All this work, however, bears upon the face of it a clear trade description showing its origin, and comes legally within the Act. There is, however, much work being done abroad, which, by a legal technicality, has so far evaded the law. To the lithographic artists of this Kingdom, it is of vital importance that all lithographic drawing should be done in this country. If artists are incapable of doing the work then it must go where capable artists are. There is the strongest possible proof from many artists in this country, who have passed years in German houses, as well as from many who have worked in the "foreign" houses in London, that it is not for want of skilled artists in this country that the drawing is sent abroad. The practice of having the drawing done abroad and the printing in this country has been, so far, sufficient to allow the printer to publish his work with the English imprint, which is morally a false trade description. The Merchandise Marks Act requires a new clause, wherein the omission of the full trade description of such goods as are partially produced abroad and only finished at home, shall be a default under the Act.

Returning to the Trades' Congress proceedings, it is very reassuring to see that three printers' representatives were elected to the Parliamentary Committee—one of whom had to retire by rule. The craft, or its representatives, must be at least popular with all trades to secure such support, and in years to come may it be possible to see that a representative of these deservedly popular, useful, and educating crafts will occupy the presidental chair.

Representatives of the Printing Business at the recent Trades Congress.

Bookbinders' and Machine Rulers' Consolidated Union—Mr. David Sharpe, Glasgow.
Bookbinders, London Consolidated—Mr. H. R. King, London.
,, Women Employés—Miss Eleanor Whyte, London.
,, Vellum (A/c Book) Society—Mr. W. Best, London.
London Society of Compositors—Messrs. C. J. Drummond, H. T. Foster, R. McBean, and H. P. Snelling, London.
Typographical Association (Bradford Branch)—Mr. W. R. Donald, Bradford.
Typographical Society (Edinburgh)—Mr. A. Ross, Edinburgh.
,, ,, (Glasgow)—Mr. J. Eddy, Glasgow.

Typographical Association (Manchester)—Messrs. R. Hackett and H. Slatter, Manchester.
Typographical Association (Newcastle Branch)—Messrs. G. B. Beveridge, G. L. Atkinson, and W. F. Toynbee, Newcastle.
Typographical Association (Scottish Branch)—Mr. R. Johnstone, Glasgow.
Trades Council (Southport)—Mr. T. R. Threlfall (compositor), Southport.
Printing Machine Managers' Trade Society (London)—Mr. D. Leahy, London.
Lithographic Printers' Amalgamated Society—Mr. G. D. Kelley, Manchester.
Lithographic Printers' (London) Society—Mr. Hurren, London.
,, Artists' Amalgamated Society — Mr. C. Harrap, Manchester.
Printers' and Stationers' Warehousemen, Cutters' and Assistants' Union—Mr. A. Evans, London.

Members of the Parliamentary Committee elected at the late Trades Congress.

Councillor G. D. Kelley, General Secretary of the Amalgamated Society of Lithographic Printers.
Mr. T. R. Threlfall, Editor of the *Leader*, and representative of the Southport Trades Council.

To Grain Zinc Plates.

Although it is not absolutely necessary to grain zinc plates, yet, experience has shewn that it is more efficacious to have the plates finely granulated to hold the water required for clean printing, than to attempt to print from plain plates. The graining by the same process as for stone is a laborious one, and any process which will give the same results will be hailed with feelings of relief. The use of zinc by photo-zinc etchers has caused them to use a process for graining zinc which may be also utilised for "printing zinc." The photographer's method is by etching in a bath, and the same may safely be used for printing zinc. The etching solution consists of 1000 parts water, 100 parts saturated solution of alum, and 12 parts of the strongest nitric acid (HNO_3). After leaving a plate in this solution about ten minutes, it will be found to be regularly grained all over its surface. The acid must be thoroughly cleared out of the grain, which can be done by washing in cold water, and finally rinsed over with ammonia (NH_3). The ammonia solution will neutralise any trace of nitric acid with which it comes in contact. The plate is finally washed, preferably in hot water to get a rapid evaporation of the moisture, dried in heat, and is ready for use.

The old firm of Messrs. Lambert & Co., of Grey-street, Newcastle-on-Tyne, has been absorbed by the firm of Messrs. Andrew Reid & Sons. The original premises in Printing-court Buildings are to be retained for letterpress alone, whilst the lithographic department will be carried on at the new premises in Grey-street. Messrs. Reid have determined to push their business on the most improved principles and have had the new premises gutted, in order that they may be reconstructed on the plan of Mr. Alf Cook's establishment at Leeds, and that of M. Champenois, of Paris.

Printing and Kindred Trades' Federation.

For the third time in the past twelve months delegates from all parts of the country, and representing the societies of the printing and publishing crafts, have met to put the machinery of the federation into working order, ready for any emergency which may arise before the next Annual Conference. Many letters were read from societies unrepresented, explaining the absence of a delegate. In most instances the society was waiting for a representative delegate meeting of its own members to take place, and to adopt, or otherwise, the federation scheme; but there was no doubt entertained as to the final result, it was simply a matter of time.

The meeting took place on Saturday, September 5th, at the Alexandra Hotel, Newcastle-on-Tyne, with Mr. C. J. Drummond in the chair. The proceedings were not extensive, and were comfortably concluded in three hours. The delegates gave reports as to the feeling of the societies on the question. Some of the seeming difficulties raised by the delegates were satisfactorily explained. The rules came on next for discussion. An amendment of one of the rules gave rise to a long and interesting discussion, the outcome being that it was considered too important to decide the matter at present, but it should be on the agenda of the next conference. Two useful items were added to the rules, by which complete tables of information are to be prepared, giving thereby valuable material to all affiliated.

The rules having been dispensed with, Mr. Palace, of the Stone Preparers' Society, made an appeal on behalf of the members against the very poor wages received by them. He cited cases showing that the employers lacked all christianity and humanity in their mode of dealing with employés. The Conference finally passed unanimously the following resolution:—

"That in the opinion of the representatives at this Printing and Kindred Trades' Federation, the wages paid to the lithographic stone and zinc preparers and shifters are, as a rule, too low to enable the men to obtain the (amount and quality) food necessary for the heavy and laborious work, and that this Federation appeals to all employers of labour to give the matter their serious consideration, with a view to paying at least the minimum rates of wages in all cases in future."

Mr. Evans, of London, brought forward the recent case of employers failing to keep a promise given to the warehousemen and cutters. In the course of the proceedings very diverse and opposite opinions were expressed: it being generally understood that the men aggrieved had scarcely sought the right means of obtaining redress. The whole discussion showed another reason for a closer and truer federation.

The accounts were audited, and found in a very encouraging condition. The subscriptions had been received from fourteen different societies.

The previous officers, Mr. C. J. Drummond, President, Mr. D. Sharpe, Treasurer, and Mr. G. D. Kelley, Secretary, were again elected. Votes of thanks to the President, Treasurer, and Secretary brought this very satisfactory meeting to a close.

Photographic Methods of obtaining Polychromatic Impressions.

Condensed from a Paper by M. Léon Vidal, *read before the Photographic Society of Great Britain.*

One of the most interesting of questions connected with photography is that of obtaining polychromatic effects, especially now that a high degree of excellence has been obtained as regards the production of pictures in monochrome. We must say at the outset, that our object is not to consider the problem of obtaining coloured photographic effects direct from the colours themselves. That is a question for the future.

For the present, we propose only to refer to well-known methods, and make use of those pigments only which one finds ready to hand. It is only intended to call upon light to perform those functions which it can so easily carry out in the various photographic processes practised at the present time.

A point which strikes us at the outset is the indifference of typographic and lithographic printers in general to the use of photographic methods. There are of course exceptions, but these are rare, and we should be glad to induce a larger number of those engaged in those industries to allow that photography ought to be one of their principal auxiliaries, and to convince them that by its aid their work could be executed more cheaply, more thoroughly, and more artistically.

For want of sufficient information it is still thought that photochromy presents serious difficulties, and for this reason chromo-lithographers always adhere to their routine methods of copying, either from nature or from works of art. Nevertheless, as we shall presently attempt to show, orthochromatic photography has made sufficient progress for us to be able to use it readily to obtain the real values of the luminosity of different colours, and also for the separation to a certain extent of different colours.

In the first of the two methods which we shall describe, the image is copied accurately as regards light and shade by means of photography, and is then coloured by means of tones of colour laid on by chromo-lithography, the selection and combination of the colours having been done by an artist in accordance with a pattern. The photographic work is extremely simple, and consists only of the execution of one single negative. This "simple photochromy" *(photochromie simple)* is at times of the greatest use, and there are many circumstances under which it is amply sufficient, and it avoids the necessity of having recourse to more complicated methods.

In the second of the two methods, one selects the colours photographically in a manner analogous to that suggested by various investigators, and amongst others by Ch. Cros, Louis Ducos-du-Hauron, and Ives of Philadelphia. In this case the preparation of *several negatives* is useful for obtaining as accurate a selection of colours as possible. We do not say that *three negatives* should be prepared, because it is possible that a larger number may be necessary, or on the other hand two or three may suffice. We confine ourselves to methods which are really of commercial and practical value, and we object to the dogmatic theories which lay down that with three primary colours one can reproduce all combinations of colours; that is an ideal which no one has yet attained, either with or without the use of photography.

We think that a photographic selection of colours, however well it may be carried out, ought to be assisted by some retouching. This is all the easier because the whole of the design is present, the modelling is to a great extent exact, and in a word it is only necessary to make a few slight corrections on a work already nearly complete. These corrections often consist only of a few blockings out on the negative, or erasures on the printing surface.

In describing in some detail this second method, which we designate by the name "composite photochromy" *(photochromie composite)*, we hope to explain the services which it can and ought to render to chromo-typographers and chromo-lithographers.

Thus, to repeat in a few words the substance of this introduction, we may say that while we are waiting for the solution of the problem of the direct reproduction in colours of polychromatic originals, there already exist two thoroughly commercial methods of combining photography with the use of colours, so as to give a result which may be as accurate as possible. One of these methods is simple photochromy, the other is composite photochromy.

We will now sketch in detail the nature of these two methods, which, it may be remarked, are by no means mutually exclusive; on the contrary, when the nature of the subject permits, they may be used simultaneously.

Simple Photochromy.—This consists, as we have said, in the preparation of one single negative, the positive print taken from which is combined with certain colours, according to the nature of the original. The negative ought evidently to be prepared with all possible accuracy as regards rendering of light and shade, and with this object it will often be necessary to use orthochromatic plates, so as to obtain the best effect.

For example, if the subject contains much red, it is necessary to use not the first isochromatic plates which one finds in the market, but plates which have been sensitized for the red rays.

As a rule, ortho- or isochromatic plates which are sensitive for yellow, are also somewhat more sensitive for green than ordinary plates, but they are absolutely insensitive to red rays.

On the other hand, plates which have been sensitized for red by means of chlorophyll, cyanine, or methyl violet, are insensitive to green. If, therefore, the subject contains also an abundance of green (as well as red) it would be impossible to render it accurately by means of a plate sensitive only to

yellow and green. (Blue and violet act only too energetically, and with regard to them we need only say that their action must be moderated by means of a yellow screen.)

One would also fail to obtain a good result with a plate sensitized only for red and yellow.

If, therefore, one does not possess plates which have a suitable degree of sensitiveness for all the colours, it is recommended that orthochromatic plates already sensitized for yellow and green be used, and that they be further treated with methyl-violet according to the formula given by Wellington in the *Photographic News* of 1885. We thus obtain plates which are sensitive to yellow and green and also to red. (A coloured slide of a bouquet of flowers and slides of the three monochromes were shown in the lantern. The red monochrome was prepared by photographing the subject on a Lumiere plate sensitive to the yellow, a yellow screen being used; the yellow monochrome by using an ordinary Lumiere plate without a screen; and the blue monochrome by using a Lumiere plate sensitive to the red, a reddish orange screen being employed to cut off the blue rays.)

Since the object is to correct the inaccuracies due to ordinary plates, it is necessary, at the outset, to have a clear idea of the subject to be copied, so as to select a suitable method of orthochromatizing the plates. The example just given shows clearly the line to be followed, and it is evident that if the subject only contains blue, yellow and green, and combinations of these three colours, it will be sufficient to use a plate sensitized for yellow and green.

The eye can judge very well of the relation between the tints of the copy and those of the original, and if the correction above referred to is not satisfactory, one can alter the formula or the screen, and prepare a second negative which shall be nearer the truth. A few trials are of little account when it is a question of doïng a piece of work satisfactorily. We insist greatly on the pains which it is necessary to take in the preparation of the negative, because it is on that part of the work that the final result almost entirely depends.

It is easy to sec, for example, that if the red has not sufficiently acted upon the plate, the latter will be too transparent in the corresponding portions, and the colour lying underneath will be smudged. The tonality must be accurately rendered to avoid this defect.

The negative having thus been obtained under suitable conditions, it now remains to produce the coloured effect. Several photographic methods may be used, but the two which are especially suitable are eollotype and Woodburytype.

As regards the colours lying beneath, we think that chromo-lithography is the method which is of most eommercial value.

If the final printing is to be done by means of collotype, the following is the procedure:—A collotype plate is prepared from the negative, and is inked in with thin retransfer ink, and impressions are taken on transfer paper equal in number to the different colours which one wishes to use. These impressions are transferred to as many grained or polished lithographic stones.

The lithographer thus has a design absolutely identical with the original, transferred to his lithographic stones. We omitted to recommend that two registering crosses be drawn on the collotype plate with a solution of tannin or gallic acid. This coagulates the gelatine, or causes it to take the ink in the same way as the parts which have been exposed to light.

The separate stones are prepared as usual with black lithographic ink, after careful study of the original and of the transfer. In certain cases flat tints may be suitable, but the colours should be graduated to follow the original, which is an essential condition. The flat tint is in all cases necessary where photography has reproduced a colour the brilliance of which is equivalent to pure white. Thus, if the original is a portrait of a lady wearing a black satin dress, the high lights produce in the negative intensely black effects, which in the positive become pure white. This is an inaccuracy which orthochromatic photography cannot correct. All that could be done would be to over-expose—a remedy which is worse than the trouble to be avoided, as it would produce a monotonous effect over the whole proof.

It is better to remedy this defect by means of a local flat tint. Black satin, even where it reflects the brightest light, does not appear to be a pure white; in order to be assured of this, one has only to bring near to it a piece of white paper. One will at once see beneath the colour of the satin a sort of light grey colour, which indicates the exact value of the flat tint.

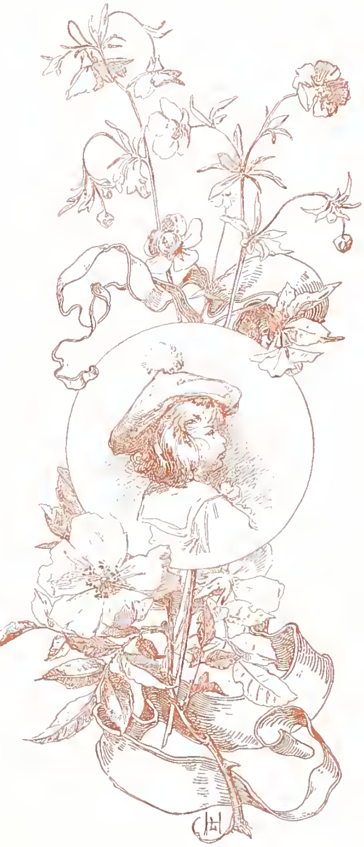
It is necessary that the flat tint be under the whole of the design to which it refers. It will be just the same for all the other colours when they produce similar effects. Having finished the colour-stones and the collotype, we proceed to take a proof. It is even better to pull first a light collotype print on white paper, and then to print the colours on it. The first proof serves as a guide, which is finally obliterated by the collotype impression of the required tone printed after all the other colours.

This first attempt, which will itself be very pretty, thanks to the irreproachable accuracy of photographie processes, may require slight correction with regard to the distribution and combination of the colours. This, however, is easy, and it will rarely be necessary to make a third trial.

This is, in short, chromo-lithography, in which photography has taken a leading part and done the most difficult portion of the work, giving effects which could only have been otherwise obtained by the employment of highly skilled artists, who would have interpreted the original rather than copied it.

(As examples, coloured facsimiles of Gobelin tapestries representing (1) An Audience of Louis XIV. and Cardinal Chigi, and (2) The Triumph of Bacchus, were shown, and also the original collotype of the latter.)

This method can be applied to all coloured subjects which contain no metallic effects. When the latter are present this method fails. Greasy inks, being wanting in transparency, do not lend themselves to the reproduction of metallic subjects. They smudge the surface and reduce the brilliancy, and fail entirely to convey the impression given by the metallie objeet



Specimens from "Designs for Graphic Artists."

London: Published by The Electrotype Company, 80 Fleet Street, E.C.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

itself. Only a vitreous ink will suit in this case, and the only method which will give good results by a mechanical process is to prepare Woodburytype prints with gelatinous ink.

For the preparation of the underlying colour print are used not only metallic powders—gold bronze, silver bronze, copper bronze, etc.—but also thin leaves of either bright or dull metal, which give more brilliancy, more metallic solidity, and truer effects. They are applied to the paper by means of lithography, but the paper should be prepared in the method suitable for the Woodburytype process. The impressions are taken on the coloured print, making use of registering marks in the same way as in chromo-lithographic printing. At first sight this seems difficult, but the manipulative skill is easily acquired, and the register is perfect. We have in this way prepared beautiful prints, which could have been prepared by no other method.

Composite Photochromy.—We borrow this name from Mr. Ives, of Philadelphia, although he gives to it a more theoretical meaning.

In this method the various colours are not interpreted by the eye, but are combined by allowing photography to carry out the required selection automatically, and preparing, by means of special negatives, the various monochromes, which, when super-imposed, reproduce the colours of the original. This method is somewhat complicated, and the photographic part of the work presents serious difficulties, because of the infinite variety of tones and tints, and the almost theoretical precision with which it is necessary to work in order to arrive at satisfactory results.

There are two distinct series of operations—first, the preparation of the negatives, and secondly, the printing of the monochromes by whatever method is chosen. Typography, lithography and collotype are the most suitable. Woodburytype may in this case also be reserved for the final printing on the proof required to give metallic effects.

Many different suggestions have been made with regard to colour selection by photography. The principal writers who have considered the question are Henry Collen, Cros, Ducos-du-Hauron, Poirée, Abney, Vogel, Stolze, and lastly Ives, who at the present moment is publishing important and remarkable works on this question. From all these researches carried out by eminent investigators, we must endeavour to deduce some practical or commercial conclusions.

It is more important in this method than in simple photochromy to orthochromatize the plates, because it is necessary in the case of the refractory colours not merely to obtain the corresponding values, but even to exaggerate their actinic effect. The red, for example, ought not merely to act upon the plate so as to produce a tint corresponding to its luminous effect; it should produce the same effect as white. Thus a red flower ought in the *cliché* corresponding to the blue monochrome to have the appearance of a white flower.

Up to the present time, having read, and tried experimentally, all that has been published on this subject, we have come to the conclusion that colour selection by means of three negatives, each intended to eliminate two of the primary colours, does not give an absolutely accurate result. Taking each colour in turn, we wish first to eliminate all colours other than yellow; or, in other words, to obtain a negative which will produce the yellow monochrome, even admitting that the three primary colours (yellow, blue and red) are sufficient to reproduce by their combination all possible colours and shades (and of this we are very doubtful), it would be necessary to eliminate successively all the colours of the subject which are not yellow, and which are not blue, and which are not red; and this is a thing which cannot be done completely.

As regards the negative belonging to the yellow monochrome, it is clear that it ought to reproduce equally all the red and all the blue, and to leave the yellow, and combinations of the yellow, with other colours represented by clear glass. A method of arriving approximately at this result is to make use of an ordinary gelatino-bromide plate. The action of the blue is of course extremely energetic in comparison with that of the yellow. The difference in effect thus utilized will give the yellow monochrome, but with the result of reproducing yellow wherever the original subject contains red. The employment of carmine instead of vermilion when printing the colours will permit the yellow to be utilized for obtaining vermilion by its combination with carmine.

Thus we obtain one negative which is fairly exact, although it does not completely separate two colours from the third.

We will now consider the negative corresponding to the blue monochrome. This one should separate out the red and the yellow—that is to say, it ought to receive from the blue colour, which is so powerful, hardly any impression, while the yellow and the red, which are so little actinic, ought to give the effect of white. The method of obtaining this result is to employ an orthochromatic plate, which is sensitive to green, red, and yellow, exposed behind a reddish-orange medium. The blue is to a large extent cut off, while the yellow and red rays pass through. The length of exposure is naturally considerably increased, but a few minutes' additional exposure are of little importance when photographing inanimate objects. For all practical purposes the negative gives fairly accurate results.

The third negative corresponding to the red seems a simple one to prepare by means of an orthochromatic plate, sensitive to yellow and used without a screen. Evidently it is not necessary to restrain the reds, which produce but a very moderate effect. The blue and yellow will produce a powerful effect, and the required colour selection will take place automatically.

If from each of these three negatives we prepare a collotype print in its corresponding colour, and superimpose these three monochromes, we shall see in most cases that we are far from the desired result. Accuracy is far from being attained, the number of monochromes is insufficient. To produce results of commercial value we must use at least four *clichés* or monochromes.

The fourth *cliché* should be obtained with an orthochromatic plate sensitive to green, yellow, and red,

using a yellow-orange screen to moderate the blue and the violet. This *cliché* gives a body to the work, which would be incomplete with the red, yellow, and blue printings only.

One ought, moreover, after carefully studying the original, to retouch each negative, and remove the imperfections which will inevitably appear whatever be the process employed. This retouching can be rapidly done ; it diminishes in no way the artistic effect or the accuracy of outline, and it enables more exact colour effects to be obtained.

The printer in colours having the above-mentioned four monochromes, sees at once what their defects may be, and a preliminary trial shows him immediately which portions require to be toned down. The bulk of the work is ready, and it need only be retouched here and there, an operation involving but little labour. [A series of slides illustrative of this were exhibited.]

In order to employ phototypography for this kind of polychromatic reproduction it is necessary to convert the negatives obtained directly into stippled negatives suitable for typography. This is done by making a positive reproduction through a grained screen. The trials can then be made by means of collotype, and afterwards when the new negatives have been corrected by hand so as to give the proper effects the typographic *clichés* are prepared.

For this process it is advisable not to use the same screen in every case. The various monochromes should be divided up by different series of points or lines, the resulting picture being better than if the same series is used throughout.

Even in the case of composite photochromy it may be necessary to print flat tints. The printer must judge what is required, and must not for a moment think that three negatives, three colours, and three printings are sufficient to produce every effect.

Theory itself we need not consider, but practice indicates clearly that, to make good use of scientific data, it is at any rate necessary to know how to combine them with facts which have, through commercial means, been well established.

This second method of composite photochromy is capable of unlimited variations which cannot be enumerated in a short paper. We must remember this, that by means of colour selection with the aid of four different *clichés* one obtains a result which leaves little to be done by hand, and gives excellent polychromatic copies. If a larger number of negatives be necessary, one can prepare two or three more, limiting more closely the colours which are allowed to act on each, but it will rarely be useful to prepare more than four negatives.

In the method described above for colour selective effects, we think it advisable that the worker should follow closely the suggestions here given. This method, although very ingenious from a purely theoretical point of view, falls far short of perfection if retouching is not resorted to, but we repeat once more that this additional labour is nothing compared to the work executed in the photographic part of the process.

Let us not be too dogmatic. Let us at present acknowledge our incapability of reproducing colours directly, and let us combine the advantages which indirect methods afford with those of judicious interpretation and retouching. Photography is already far advanced, but cannot yet be trusted to give immediately the monochromes required to produce by their combinations a polychromatic impression exactly similar to the original.

If we grasp thoroughly the points which are necessarily but briefly described above, all lithographers and typographers can obtain excellent results in copying from nature or from works of art. Practice will, of course, increase the manipulative skill and permit the result to be more easily obtained. It appears, then, strange that there are still so few photographic studios devoted to these kinds of printing. How is it that collotype, which is so simple and so easy a process, and which would be of such great assistance to the lithographer, is still only worked by a few specialists ; while, on the contrary, no lithographer ought to be able to dispense with it? We should be glad to make lithographers appreciate that it would be of the greatest help to them in all kinds of photochromy.

That is the object of this paper, and we hope that the fact of its being read before the Photographic Society of Great Britain will cause photography to be more generally applied for the production of polychromatic impressions. Space has not permitted the insertion of technical details, but we are convinced that through the great advances which have been made in orthochromatic photography, and with the aid of the remarkable results which have been published on this subject by many investigators, especially in England, it would be easy for anyone who wishes to practice photochromy to do so successfully, by adopting, according to circumstances, one or other of the methods above described.

[In the foregoing paper several points struck us as rather misleading to the reader. In the first place in simple photochromy, collotype plates have to be made from reversed negatives, that is, taken with a mirror, or the ordinary negative has to be stripped and remounted. If a negative is taken in the ordinary way as used the collotypic impression will be transposed as regards right and left. And again, in alluding to greasy ink being wanting in transparency, some colours are of such a nature as to render any ink made with them opaque, as chrome yellow, vermilion, &c., but it is not the fault of the lithographic (greasy) quality of the ink, as a great many of our inks are beautifully transparent and brilliant, and by no means smudge the surface if properly printed.—Ed., B.L.]

Plates for Photo-lithographic and all other Photo-mechanical Printing Processes.—The beginner, who through want of time to prepare his own sensitized plates by the wet collodion process, and who is desirous of making successful negatives for photo printing processes should not on any account waste time and money by using the ordinary dry plates of commerce. The only dry plates for such purposes are those specially manufactured and known as England's Rapid Chloride and Mawson & Swan's Photo-Mechanical.

New Lithographic Transfer Ink.

In the *Photogr. Correspondenz* Prof. K. Kampmann, of the Imperial Austrian Institute for Researches in Photography and Lithography, publishes a very interesting report on his experiments conducted with a view to produce a new transfer ink. He says:

"Every practical lithographer knows that lithography is based upon the fact that it is possible to form upon the stone two new layers possessing entirely different properties.

"One of these layers is fatty, and for this reason repulses water, remains dry and takes the ink easily and readily when the stone is rolled up; the other layer is made acidulous through treatment with an acid, and consequently repulses fatty substances or colours. Experience has taught us that the quality of an impression depends upon the circumstance that each of these two layers possesses the above-mentioned qualities to the fullest extent, or, in other words, the fatter the one and the more acidulous the other the better the stone will print, and the more saturated, clear, and distinct the impressions will appear.

"Up to now two prime ingredients, soap and fat, to which the necessary consistency was given by an admixture of wax, shellac, rosin, &c., have been principally employed as ink, colour, crayon, or transfer ink for producing the lithographic properties of the stone, *i.e.*, the fatty layer. Ink, colour, or transfer ink must for this purpose answer two requirements. In the first place they must contain a sufficient quantity of fatty substances to enable the stone to form the fatty layer, and they must, secondly, protect the covered places against the action of the acid during the etching process. In places where the acid permeates, the fatty layer does not take ink well, and the consequence is an impression with places which either appear pale or are left blank altogether, which defect is extremely difficult to remedy.

"Of the two first-mentioned substances for producing a fatty transfer upon the stone, ink and crayon, it may be said without hesitation that they can be procured in such excellent quality that, provided they are used in the correct way, they answer all requirements. In reference to transfer ink, however, there is a wide field open for experimenting, for it appears often desirable for the different processes of lithography and photo-lithography to improve or slightly alter the component parts of such transfer inks as are bought in the open market. These inks consist as a rule mostly of soap, to which smaller quantities of wax, tallow, varnish, lampblack, etc., are added and mixed until the necessary consistency has been obtained. A larger proportion of soap, of course, furnishes a large amount of fatty matter, and the consequence is a fully saturated impression. But every practical man knows what has been said time and again in trade papers, that such transfers require reinforcement by rolling up, and must be etched very carefully if the design is not to be spoiled. The transfer ink offers, in consequence of the large proportion of soap it contains, not sufficient resistance to the acids, which, therefore, comparatively easily dissolve, soften, and permeate it. In other words, it does not sufficiently protect the covered places, and this defect is shared by the linseed oil varnish used for thinning down the ink. This evil of insufficient resistance against the action of the acid upon the thin layer used for the transfer (on the quality of which depends the result of the whole operation) can hardly be remedied with the help of the materials heretofore used in the preparation of transfer inks, because whatever the proportion of the ingredients may be the ink does not print nicely and perfectly and at the same time answer all other requirements.

"If what has been said is correct in reference to the stone, it is still more true in regard to transfers upon metal, and consequently too great importance cannot be attached to experiments which promise to overcome these evils. Recognising this fully, I believe that after years of investigation and experimenting I have found in 'elemi' a substance which possesses the necessary properties and the required consistency. The use of this material makes it possible to reduce the quantity of soap and soft fatty substances like tallow and varnish to a considerable degree, without diminishing the strength and resistance of the covering layer, or the saturation of the fatty layer; on the contrary, these desirable and necessary properties are greatly strengthened.

"Elemi is composed of acidulous and neutral rosins, which contain the so-called elemic acid. My experiments have proved that this acid acts similarly to soap or other fatty acidulous compositions, and that a transfer ink containing elemi in the place of soap can be prepared without difficulty.

"The efficiency of this ink, prepared in a way ascertained by me after long and careful experimenting, is excellent, and in no way second to the transfer ink sold by dealers whose composition is kept secret. It is, indeed, a so-called strong colour, and every transfer ink should and must be this, but it can be easily used for rolling up (except if the room or the store is too cold), it pulls off well, does not blur the design, not even the most delicate crayons, and produces, if the layer is right, a transfer that answers all requirements. This transfer ink is prepared in the following way:—

"Twenty parts of asphaltum and 100 parts of rosin are dissolved in 40 parts of warmed oil of turpentine, and then added 20 parts yellow wax, 140 parts tallow, 230 parts gum elemic, 30 parts Conti's soap, 60 to 80 parts medium strong linseed oil varnish, 80 to 100 parts best lampblack. Another formula, which contains ready-made transfer ink instead of soap, is the following:—

"Twenty parts asphaltum and 100 parts rosin are dissolved in 40 parts of warmed oil of turpentine, and then the following substances are added: 40 parts wax, 140 parts tallow, 230 parts gum elemic, 20 parts Venetian turpentine, 49 parts good transfer ink, dissolved in 60 parts of medium strong varnish, and 60 to 100 parts best lampblack.

"All these ingredients are boiled together thoroughly and then ground finely at least three times.

"It may be mentioned finally that this elemic transfer ink answers all purposes of photo-lithography and photo-zincography as well, as experiments in the Imperial Austrian Institute and in several of the largest lithographic establishments of France have proved beyond the shadow of a doubt.

"The boiling of transfer ink is, it must be admitted, a manipulation that requires practice and experience, and it is necessary to look out that none of the ingredients contain water. As a rule the mixtures given above are heated until the vapours ignite. This ignition is smothered by placing a lid upon the vessel containing the matter, and the ink is then boiled until it flows smoothly and evenly."

Glue Reliefs for the Production of Watermarks, &c., &c.

By J. Husnik, Prague.

The watermarks which still appear at the present time on almost all kinds of letter paper, bank checks, stocks and other financial papers, are produced by two different processes. One of these is with the aid of the "Egoutteur," that is, with a mark placed into the sieve, and thus modelling the watermark during the formation of the paper. In the other process, glued thread is pasted on a piece of heavy cardboard, across the letters or design previously drawn on the board, which, when dry, is pressed into the paper with a burnisher wherever a watermark is wanted.

Both methods give only extremely coarse lines and contours of designs, so that, for instance, a hand of the size of 1½ cm. will appear without fingers, like a pair of mittens, and the face reminds one of the primitive drawings and caprices of little children.

Besides these two kinds of cartoons for water printing (generally designated with the name of "cover"), better work is produced by cutting very fine letters and designs out of strong parchment paper and pasting them on cardboard. But such covers are very dear and leave a good deal to be desired.

I have succeeded in putting any agreeable lettering or design on a thick gelatine film flowed on a piece of heavy cardboard, by simply photographing the design, copying the same on the Leim sheet and developing until all gelatine has been removed and the design or drawing remains in relief.

If a photographic copy of the drawing is to be produced as a watermark, it is taken with a net, and is therefore autotypic and must be treated accordingly.

As such gelatine relief covers will endure 100,000 impressions for watermarks, it is now easy for everybody to have his own portrait, picture of his factory, name of the firm, or any lybel, handsomely decorated and clear, as a watermark, put on his letter paper; and a large field is opened in the same way for watermarks on stocks, bank papers, passports, and all kinds of official documents.

The firm, Leykam Josephsthal, in Vienna, has acquired the patent for the production of watermarks by gelatine reliefs, in Austria, and is receiving already large orders from all countries.

By a small modulation, Leim reliefs can also be applied. They are stamped in paper of variegated colours, and such stamped papers are then used in the manufacture of book covers, paper boxes, etc.

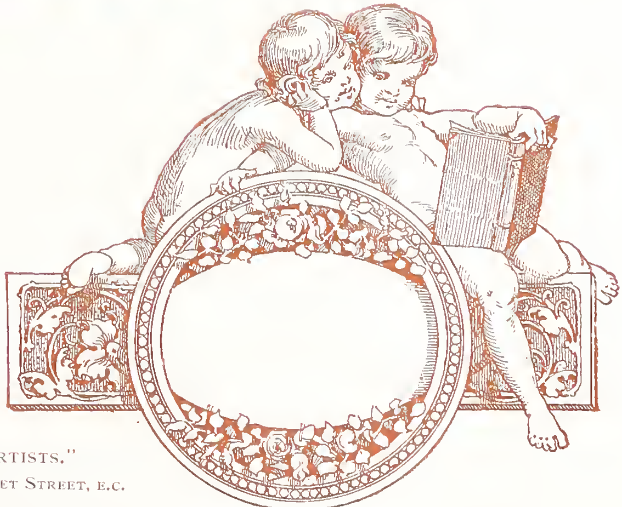
In such a manner, the most complicated drawings can be stamped into the paper, and as the production of these reliefs is attended with almost no expense, it can easily be judged what immense advantages the covers offer for this branch of industry, engraved or brass plates being at present used for this purpose at considerable expense.

Instruction books, maps, etc.; for the blind can also be produced to great advantage with my gelatine reliefs. The books heretofore made for the blind and produced by stamping the letter or type with pointed moulds on heavy cardboard, are very defective; the pointed reliefs lose their sharpness so quickly after having been touched several times by the blind when reading, and the contours disappear so much, that the signs can only be deciphered with difficulty.

This is not the case with my reliefs, which are so hard that they will never wear out, and by their easy and cheap manner of production, the possibility is offered to furdish books, maps, etc., for the instruction and entertainment of the blind in a way not before attained.—*Anthony's Photographic Bulletin.*

Lithographic Transfers on Glass.

The face side of a lithograph being, when transferred to glass, the undermost, the colours should be printed exactly the inverse way—*i.e.,* the key should be printed first instead of last, and the other colours in exactly the opposite order to that in which they would be printed for ordinary chromos. The paper may be prepared with any composition soluble in water. To cause it to adhere to glass either use as a last printing any composition containing Canada balsam, gold size and terebene, Venice turpentine or other ingredients which soften and adhere with the application of slight heat under pressure, or use tacky varnish on the glass itself. After the paper and print are fixed to the glass surface by means of a gentle heat, cold water will bring the paper off. Use ordinary litho inks, as strong and stiff as they can be used, to lift, and be sure to let them thoroughly dry between one working and another; they will keep for years. Another useful process is to have a roller in contact with the printing cylinder of the machine covered with soft flannel and the light springs. The cylinder is to be tightly covered with an india rubber blanket on which the colours one after another "set off" and are again "set off" on to sheets of glass, tin, etc., as they pass between the printing cylinder and its soft covered pressure roller. In this method the drawing on stone must not be reserved, but be drawn right away about, so that when reversed on the rubber it may be reversed and come right away about on the glass.



SPECIMENS FROM "DESIGNS FOR GRAPHIC ARTISTS."

LONDON : PUBLISHED BY THE ELECTROTYPE COMPANY, 80 FLEET STREET, E.C.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

"Caxton" Convalescent Home.

[We have pleasure in giving prominence to this appeal for a worthy and necessary object, and trust our readers will help on the good cause. We would suggest office collections of a penny per week. Every penny will tell.—Ed. B.L.]

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An Appeal to the Employers and Employed in the Printing and Allied Trades.

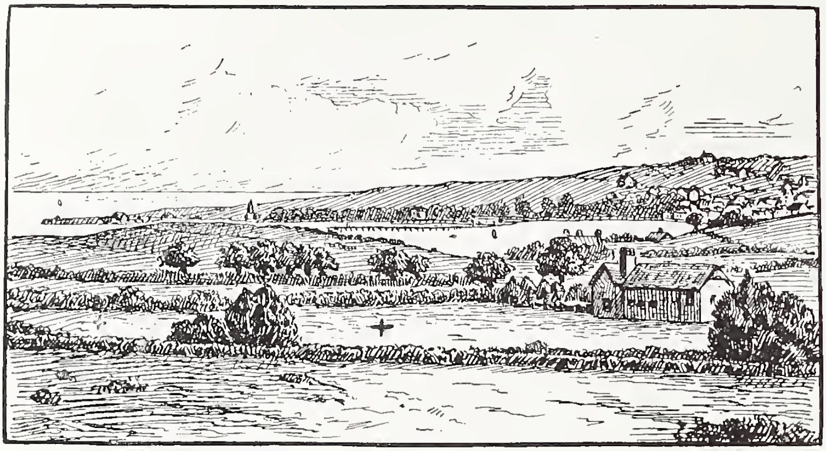
It is now more than a year since—recognising the great benefits to be derived from convalescent homes as health-restoring agencies, and knowing the extent to which those employed in our particular trades are subject to ailments recovery from which depends so much on change of air and surroundings—we initiated a movement for establishing, on a self-supporting basis, a Convalescent Home and Sanatorium for the Printing and Allied Trades. Though during that time our progress has not been so rapid as was anticipated, we claim to have avoided mistakes which, in the long run, would have militated against the success of our proposed Institution, and are consequently able to place before the trades a scheme worthy of our crafts, which will prove of material and lasting benefit.

Believing that while soliciting subscriptions it was necessary, as early as possible, to put forward something definite and tangible, we endeavoured, in the spring of last year, by advertisement and communication with estate and property agents in London and on the south coast, to obtain a suitable residence in which to establish the Home. As long ago as May in last year, a deputation inspected a property at Bexhill, but, guided by the experience gained from a thorough inspection of the Metropolitan Convalescent Home established there, they found that the necessity of alterations, and the distance from the sea, were difficulties too great to be overcome, and therefore reported against acquiring the property.

A Site Committee was subsequently appointed, and properties situated at Worthing, Lymington, Milford-on-Sea, Boscombe (Bournemouth), and Swanage were inspected; the result of these visits and deliberations being the recommendation of a residence at Swanage which was then for sale. Mr. Saxon Snell, junior, f.r.i.b.a., kindly offered to inspect this property for us, and his generous offer was accepted. Mr. Snell reported very fully, and though this property was in many respects suitable, the difficulties and disadvantages which presented themselves to the eye of an expert were such that the idea of negotiating for its purchase was also abandoned. We then unanimously came to the conclusion that it was useless to proceed further with the endeavour to purchase a suitable residence, and accordingly a resolution was passed to acquire a site in Swanage, and erect a Home thereon.

Though the distance from London is greater than some may think desirable, we have every reason to believe that in a short time the railway arrangements will be such that the journey can be accomplished in three hours. But the primary consideration is this—a Convalescent Home for the Printing and Allied Trades must be specially constructed and arranged, and its site carefully selected; it must be so situated as to be beneficial to those suffering with chest diseases, and there is no place nearer London or easier of access to which we can with safety, *all the year round,* send

patients thus affected. It would be little short of a calamity if, when the Home is erected, its situation should be such that after a long illness or course of treatment at one of the hospitals, the medical men should, in a majority of cases, regard the place as detrimental to the patients' perfect recovery.



The Site.
(The spot marked + + is the site selected.)
Extent of proposed site, 2¼ acres. Cost, £600. The property of Geo. Burt, Esq., Ex-Sheriff.

The reasons for erecting the Home at Swanage are many, and, we trust, will be considered by the various trades as satisfactory and convincing, when due importance is given to the serious fact that, owing to the great tendency to chest disease amongst the workmen employed in the different trades, considerable difficulty is often experienced in endeavouring to obtain admission to any of the existing Homes, in consequence of the climate and peculiarities of the various places being suitable for chest complaints only during certain months of the year. Having these facts in view, we endeavoured to obtain information and co-operation from the physicians of the chest hospitals, and are glad to report that such help was freely given—the knowledge thus derived being of considerable value. Dr. Vincent Harris, physician to the Chest Hospital, Victoria Park, wrote that he "considered the coasts of Kent and Sussex quite unfit, but that Hampshire (towards the west), Dorset, and Devon, contained many suitable spots"; while an eminent medical authority in Bournemouth considers Swanage preferable to Bournemouth during a portion of the year. In a published report, Dr. Forbes Winslow, physician to the North London Hospital for Consumption, speaks enthusiastically in praise of Swanage, and considers its climate and peculiarities in every way suitable for those suffering from chest complaints, while statistics shew that it is the coolest summer residence on the south coast—"a proof," says Dr. Winslow, "of its fitness for invalids afflicted with other complaints than those influencing the respiratory and circulatory systems." Swanage possesses, with two or three exceptions, the warmest night temperature in England, with the least difference of range between night and day. The spring and winter are mild; it is at all times free from fog and penetrating winds; the air is bracing; the rainfall is small; it has beautiful surroundings, and the water supply is excellent.

We have also been singularly fortunate with regard to the selection of the site. Mr. Saxon Snell, junior, visited Swanage, and subsequently reported upon several suitable sites, of which we selected three, all well situated; the final selection to be governed by a medical expert. For this purpose, Dr. Benjamin Ward Richardson, LL.D., F.R.S., and Mr. Saxon Snell, senior, F.R.I.B.A., generously offered their services, and, after inspecting five sites, recommended two as most eligible. The one selected by us is near the sea, easy of access, pleasantly situated, surrounded by beautiful scenery, and outside the building area.

Elevation. Facing south-south-east. Accommodation for 50 patients. Cost, £6,000.

We cannot conclude this portion of the report without recognising the generous spirit displayed when we have sought assistance or advice from gentlemen in a position to give it, and we believe that the fact of the site being chosen by Dr. Richardson and Mr. Snell must tend to strengthen our position and create

confidence amongst those for whose benefit the institution is intended.

Plans have been prepared for a Home to accommodate fifty patients, which will possess every modern improvement in sanitary and other requirements. The kitchens, &c., will be apart from the main building. The bedrooms will be large and spacious, 750 cubic feet being allowed for each bed, and, though accommodation for 50 beds may seem large, it must be borne in mind that, considering the necessary offices and day rooms, the cost would not be much less for 30 beds, while it is very desirable that there should be a bed vacant whenever a patient is ready to occupy it.

A rough estimate of the cost of land, building, and furnishing is £7,000. This appears a large sum, but the Committee believe that what is worth doing at all is worth doing well, and that it will be cheaper in the end to erect a substantial building, with all scientific improvements, than to have in our hands a thing of shreds and patches, which would always be an expense in repairs and alterations, without, perhaps, giving satisfaction.

We sincerely regret to announce that Mr. J. P. Simcock, our late Secretary, whose health had completely broken down, has since died, and we take this opportunity of saying that it is owing in a great measure to his untiring zeal and perseverance that the movement has reached its present stage.

The receipt of donations and subscriptions in the initial stage of the movement to the amount of upwards of £300, confidently assures us that the income for maintaining the Home will be readily raised by systematic collections of small sums in the various firms, while to obtain the large sum necessary for building we must look, to a great extent, to the generosity of our employers, who, we sincerely hope, will co-operate as cordially in this as they have always done in other movements having for their object the welfare of those engaged in the printing and allied trades.

In conclusion, we earnestly appeal to all engaged in any capacity in either of the different trades, to assist in raising the necessary funds, and to unite in a grand effort to accomplish so noble a work. This done, the building can be commenced without delay, and the Home opened to receive the weak and languishing ones amongst us, so that they may be restored to our ranks healthy and strong.

R. W. Minter, *Chairman.*
Chas. Irvine, *Hon. Secretary,*
15 Charrington-street, N.W.

Subscriptions and donations will be thankfully received and acknowledged by the hon. treasurer, Mr. C. W. Bowerman, 4 Battledean-road, Highbury, N.; or the hon. secretary, Mr. Chas. Irvine, 15 Charrington-street, N.W. Postal Orders or P.O.O.'s to be made payable at Hampstead-road, N.W. Cheques to be crossed "Birkbeck Bank."

Collecting sheets can be obtained on application to the hon. sec.

We hear that Mr. Alfred Holt, of Manchester, has again gone into business in that city. It may be remembered that it is not long since he gave up business and took his connection with him into a large printing firm of Manchester, as general manager.

Technical Students.

"Comparisons are odious" and frequently misleading. The reports of the number of technical students in typography and lithography who competed at the last examination show a decided falling off all over the country, but this decrease is more apparent than real, as in most of the classes there has been a considerable increase of students. For instance, the report for the past year of the London Polytechnic Institute in Regent-street, shews that in the various printing trade classes 320 students were entered on the books, and in the engraving class 75 more. It is well known that many students attend the classes more for the technical information thus obtained, than for the purpose of passing an examination, an ordeal from which many shrink, and at which many more are of opinion that, under present conditions, the knowledge they do possess is not thoroughly tested.

It is not generally known that at the Polytechnic School of Art, in addition to drawing, painting, and modelling, there are classes for instruction in wood engraving, etching on copper, and book illustration. Special instruction is given in ornamental and technical design, and in decoration.

The Lithographic Class at the Polytechnic Institute, conducted by Mr. W. Layton Wilson, meets at 8 to 9.30 on Wednesday evenings, commencing October 7. Mr. Wilson desires us to state that he will be pleased to introduce any really good inventions in connection with Lithography, or submit samples of artistic merit in any of the branches of the graphic arts to his numerous students, and anything new or interesting as exhibits will be very acceptable. His address is "Stanmore Lodge," Sistova-road, Balham, S.W.

For No. 2.

The next occupants of "Our Portrait Gallery" will be Mr. William Bemrose and Mr. Henry H. Bemrose, principals of the eminent printing and publishing firm of Derby and London. Messrs. Bemrose & Sons are amongst the largest—as they are amongst the best—chromolithographic and process printers in the United Kingdom, and a charming specimen of their collotype printing will accompany the notice of themselves and their extensive works at Derby.

The Twelfth Edition of "Successful Advertising,' by Thos. Smith and J. H. Osborne (Smith's, 132 Fleet-street, E.C.; price 2/-), is growing more corpulent than ever, a pretty sure sign that it is high in popular favour. The contents are calculated to shew that advertising is a vital force in successful business, and every page emphasises the lesson with more or less strength, while the histories of the progress of enterprising advertisers of the day reads more like romance than reality. Prospective advertisers, as well as old hands at the business, cannot do better than consult "Successful Advertising" if they wish to be successful themselves.

Trade Notes.

We have seen copies of testimonials received by the Patent Lithographic Zincplate Company, Ltd., Hull, together with a list of the firms using their plates, and it speaks volumes for the quality of the material supplied that the names of so many leading firms are to be found on their list of customers. In the plates, as supplied by this Company, the facing is in actual combination with the zinc, and cannot crack or peel off, while it is durability itself, as is evidenced by the fact that one firm has printed 22,000 copies from one of the plates, without the least failing in results. What is possible to one firm is possible to another, though, unfortunately, men here and there throw difficulties in the way on account of the little extra labour which always occurs with new things until the working is thoroughly known. How many years has it not taken to perfect printing from lithographic stone since it was introduced? For their own credit's sake, principals should see that their plates are as fairly treated and turn out as successfully as those of the houses referred to.

It is a matter of regret that when the Company was formed by Mr. H. B. Toobe, the litho. trade were not offered an opportunity to take up shares, so that they would receive a bonus on their orders in the shape of a dividend. We hear that the Company is doing very well, and that applications for shares have been made at different times by prominent firms, and it is to be hoped that the Company will in time find a way to let the trade also invest in it, and thus share in its profits.

The field of usefulness for a substitute for lithographic stones is very wide indeed; the quarries providing the bulk of our stock are rapidly becoming exhausted, while the demand for large sizes is increasing, so that the introduction of these plates will soon become imperative. In the United States the various litho. processes are developing by leaps and bounds, and according to official returns the Americans are using more stones than all the other civilised countries put together; and as they eagerly take up any improvements, the Company's plates are sure to find an extensive sale there. We hear that the Company is endeavouring to secure the American market, which would certainly mean a big addition to the profits already derived from the English market. We hope soon to present a supplement printed from the new litho-zinc plates.

Amongst first-class Lithographic Machines the "Edinburgh," built by Messrs. A. Seggie & Son, of Broughton Market Works, Edinburgh, holds an undeniably high position for the quality of work it produces at rapid rates of speed, and its thorough reliability. Many of the best Scotch colour printers will have no other, and even in English printing centres, such as Manchester and Birmingham, it has many appreciative users. Messrs. Seggie & Son seem to spare no expense in quality of material and finish of workmanship, and every means that skill and practice can suggest seem to have been exhausted in combining simplicity of design with perfectly reliable action in producing the finest results both in monochrome and chromo work. The latest "Edinburgh" litho. machine turned out by this enterprising firm is a fine example of engineering skill, with the accuracy of fitting and finish so essential for producing the finest commercial and register work, and as shewn in the illustration in the firm's announcement elsewhere, is handsome withal, as machines go. The cylinder is specially designed and surfaced to take any impression with entire rigidity and the nicest delicacy, whether in line, flat, or tint; the printing surface mathematically identical with the gear, which tells for the preservation of the work on the stone. The blanket attachments are specially simple. The bed is similarly rigid and true with the cylinder, with wedges of an angle and breadth amply sufficient to sustain solidly the severest pressures, besides taking thicker stones than is usual on most machines, and rising at either side. The pressures are sustained equally throughout from cylinder to base. A patented lever cylinder-lock (which can be attached to machines of other makers) gives absolute security to any speed. The registering lays are duplex, self-acting, and adjustable to a nicety without stoppage, with simple and wear-compensating mechanism. The inking arrangements are such that almost any amount of added inking power can be brought into play, with rollers of solid iron, covered with finest French skins, working noiselessly in swivel brackets adjustable for diagonal rolling, and riders of large diameter polished-tube and of steel. Inkers can be run on both stone and slab, on slab only, or clear, and the ink supply can be regulated to a nicety or cut off by one screw and without stoppage. Double inking adjustments of simple and ready construction are provided, along with apparatus to facilitate the feeding, and to control sheets stretching and creasing. In fact, nothing seems to have been left undone to provide a machine capable of doing any and every class of work in the best and most economic style. A special feature of Messrs. Seggie's litho. machines is their ease and quietness of running, a sure proof of the excellence of design and workmanship. The "Edinburgh" litho. machines are built in eleven sizes, from quarto-demy up to quad double-crown. All the large sizes are double geared, and fitted with automatic damping apparatus and automatic counting apparatus at a small advance on list prices. We notice amongst the numerous flattering testimonials from users of the "Edinburgh" litho. machines, that some eminent Scotch firms are running from six to ten on work in twelve to twenty colours with the utmost satisfaction in regard to quality and speed of production.

The lithographic presses, for hand or steam power, built by Messrs. Seggie & Son, have, like their machines, had for many years an established reputation as amongst the best in the market. The beds are of well-seasoned plane tree, and run on friction rollers; the framing is all iron, and the crossheads and rollers of best wrought iron. Sizes 24 by 36 and upwards have wheel and pinion gear, and automatic run-up of tympan can be added if desired. The steam

presses run the bed out and in automatically, with quick return motion. The most approved design, the best materials, and sound workmanship render these presses specially suitable for use abroad. Seggie's Overhead Stone Grinding and Polishing Machine is equally useful for stones or zinc plates, and economical of space, being suspended from the ceiling over the grinding trough, and economical of labour, its use mastered in a few hours, while the quality of its work is pronounced by users to be "perfect." The work is done automatically, the operator simply guiding the grinding disc over the stone. Judging from Messrs. Seggie's list the Overhead Stone Grinder is thoroughly appreciated everywhere, as besides being used from one end of the United Kingdom to the other, it has found its way on to the Continent and to the Colonies.

To such of our lithographic friends as are also letterpress printers or publishers, the announcement of the Meisenbach Co., Ltd., on another page, will be of interest. There are very few things from which this Company cannot make first-class printing blocks, and in saying this we speak from experience, having used large numbers of their plates both in our own work and for our clients, with the utmost satisfaction in every instance. They have brought their half-tone process to a degree of perfection in brightness of delineation and delicacy and softness of effect that is not surpassed by the best efforts of Continental or American photo-engravers. Another feature about the Company is promptitude in the execution of orders and a strict attention to instructions.

Several announcements arrived too late for full notice in this issue. Amongst others, that of Mr. J. W. Elliston, who has commenced business as a fine art engraver, photo-lithographer, electro and stereotyper, at 4a Upper Thames-street, E.C., with branches at 142 Fleet-street; 3 Falcon-court, E.C.; and 117 Upper-street, Islington, N. Mr. Elliston makes a special feature of half-tone and line photo-zinco productions, of which specimens will be shewn in future issues.

Mr. Jas. Freeman, trade lithographer, has, we understand, removed from Dyer's-buildings and taken more commodious premises in Hatton Garden. He has had electric light installed in his machine and press rooms by Messrs. Cathcart, Peto & Radford, with a view of matching tints for wall-paper decorations in the forthcoming winter.

The designs for Messrs. Mander Brothers' and Messrs. Parsons, Fletcher & Co.'s announcements on the first and fourth pages of our cover were drawn by Mr. T. B. Widdowson, who has a card on another page. He is what our friends across the water call a "live" business man, executes work promptly as promised, and is brimful of ideas.

Lithographers troubled with creasing or gathering of paper while printing should enquire into the merits of Rouse's Patent Tension, advertised on another page. Absolute stoppage of creasing and exact register is claimed to result from its use.

Our readers will find in the business announcement of Messrs. Taylor Brothers, on another page, a number of items that will be both useful and interesting to them. The Desk and Pocket Calendars are an exceptionally interesting series, and include an artistic design specially suited for printers and manufacturing stationers, which will assuredly be popular with the craft. One of the quarto designs is fitted with a pocket and another is utilised for the cover of a blotter. All the 4to sizes have monthly date slips and blank spaces for customers' cards. Though not numerous, the series is noticeable for its high standard of artistic taste and finished technical execution, points in which Messrs. Taylor Brothers are always at the front in everything they publish. The date blocks are in monthly and weekly "tear-offs" in various sizes, and are neatly printed with bold, clear figures.

Amongst other novelties issued by Messrs. Taylor Brothers are bordered cards, of which they send us upwards of eighty different designs in three sizes. Some of these we have seen before, but the majority are new patterns, while the variety of style and colouring is comprehensive enough to suit the most fastidious critic, and the execution superior to anything of the same kind that has come to our notice for a long time. From the frequency with which we see these bordered cards in use by the trade, we should say they are in very extensive demand.

Constant additions are also being made by Messrs. Taylor Brothers to their very chaste series of "In Memoriam" cards, which now numbers forty designs. The latest additions are four upright (four-page) cards —Nos. 35, 37, 38, 40—two with floral crosses and two with sprays of flowers only. The free introduction of flowers and appropriate views is a notable feature in the series, and the variety of effect obtained in simple combinations of silver, black, and grey tones and half-tones is surprising. Messrs. Taylor Brothers' "In Memoriam" cards will be difficult to surpass in chaste effects and admirable printing, and no printer's or stationer's stock is complete without a selection of them, especially where a high-class trade is cultivated.

"Colour Printing by modern methods for the Trade" is a line in Messrs. Taylor Brothers' announcement that should be remembered by our friends whose facilities are not equal to the execution of all the orders they may secure. The offer of the resources of their extensive and well equipped establishment to all who are desirous of obtaining the best work, either plain or in colour, at moderate prices, will enable many printers to take work that they have hitherto declined, and thus add to their profits with a minimum of trouble to themselves. The latest machinery and the practice of the most modern methods, enables them to offer decided advantages to clients. "Send your instructions, we do the rest" would be a good motto for this enterprising firm.

The Meisenbach Company, Limited, have removed their City office to 188 Fleet-street, their works being still at West Norwood. Some beautiful specimens of their half-tone work will be shewn in early issues of The British Lithographer.

Our readers who appreciate really artistic steel-plate work should see the beautiful collection of Steel-plate Calendars by J. A. Lowell & Co., Boston, U.S.A., now being offered to the trade by their sole European agent, Mr. M. P. McCoy, of 54 Farringdon-road, E.C. To describe them in detail would occupy more space than we can spare, but we may say that there are upwards of eighty designs, from the size of a business card up to imperial-quarto. The designs include characteristic groups of dogs, tigers, and birds, yachting scenes, ironclad men-o'-war, ocean steamers, charming rural and landscape views, waterfalls, fishing groups, sketches of American city and urban life, picturesque American harbours, a number of exquisite floral and foliage pieces, and, lastly, admirable portraits of the Prince and Princess of Wales, set in tasteful borders, which we reproduce. Design, grouping, and technique are all of the highest and most artistic class, and the effects of that chaste and attractive character obtainable only from really good steel engraving. A complete set of samples costs 25/-, but sets of special sizes may be had at 2/- to 9/- per set. All are provided with neat tear-off monthly calendar slips.

Complaints are rife that really good copperplate engraving is difficult to get. Our friends should try Mr. G. L. Henderson, who has a card on another page. The specimens of his work we have seen are really excellent in form and finish and recommend themselves as being from the hands of a master.

On Saturday, September 5th, the employées in the Litho. department of Messrs. Blake & McKenzie, the eminent Horticultural and Art Printers, Liverpool, held their twenty-first annual picnic. At twelve o'clock a well-appointed waggonette started from the office, and proceeded by way of West Derby (where, by an excellent arrangement, luncheon was served), Kirby, Melling, and Mughull. A drive of fifteen miles brought the party to Thornton, a pretty village, where a splendid view of the Welsh coast is obtained. After various games, the company, numbering forty, sat down to a sumptuous tea, served up in the best style. Tea being over, the chair was occupied by Mr. J. Honeyman, foreman of the department, the usual toasts, "The Firm," "The Litho. Department," "The Ladies," etc., being duly honoured. After some choice songs by members of the company, each lady was presented with a handsome bouquet of flowers. The return journey was started at 8.30, by way of Crosby, Waterloo, and Seaforth, arriving in Liverpool at 10.30, after spending a most recreative and enjoyable day. The arrangements were carried out in an excellent manner by Messrs. C. Whale and H. Edwards.

The Next Printing and Allied Trades Exhibition, as our readers will see from an announcement on our last page, is to be held in September, 1892—eighteen months after the last. We hear that the number of exhibitors already shows an increase, and the date fixed gives ample time for others to make up their minds and also to prepare good exhibits.

New Books.

A THIRD SERIES of "DESIGNS FOR GRAPHIC ARTISTS" has just been issued by Messrs. Thiel & Schkerl, of Vienna, and is published in this country by The Electrotype Company, 80 Fleet-street, E.C. (20/-, carriage free). Elsewhere we give several pages of selections from this (and previous) series, which will give artists some idea of the usefulness of these publications as suggestions in art designing generally. The new series is a distinct advance on its predecessors, good as they are; there is less of the mediæval element and more of modern English ideas in the third series, and this should ensure it a hearty reception here. The work consists of about forty folio plates, embodying something like a hundred suggestive designs for artistic, decorative, and business purposes, excellently produced and capitally printed.

PART I. of "Modern Decoration" and Part III. of "Romanesque and Gothic Church Decoration" have been sent to us by the publishers, The Electrotype Company, 80 Fleet-street, E.C. The first is a new work by W. Zander, showing a series of rich designs for interiors of churches, public and private buildings and mansions, etc. In the initial part there are one imperial (folded) and five folio imperial plates, mostly of ceilings and panels; the second work (folio royal) contains reproductions of some of the finest ancient and mediæval designs in altar-pieces and windows, friezes and dados, wall decorations, etc. The plates are handsome examples of the chromo-lithographic art, beautifully printed on fine card. They will be completed in 24 and 30 plates respectively. Such works are an invaluable storehouse for decorative artists.

THE September number of *The Art Decorator* (The Electrotype Company, 80 Fleet-street: monthly, 1/-) is again an interesting issue. The five admirably executed chromo plates include (1) a sheet of dainty sprays of foliage and flowers from a service of porcelain manufactured by G. Demartial & Co., Limoges; (2) a plate of friezes and corner-pieces in "art" tints; (3) six original menu vignettes in monochrome; (4) ten designs for wood, poker-work, or leather, most of which could be utilized for book covers; and (5) a fine plate of reproductions of sixteenth century ornamental metal work, from the Dresden Historical Museum and the church of St. Michael, Munich. We give elsewhere a reduced reproduction of a plate from *The Art Decorator:* the plate is scarcely so good as we should have liked to enable us to do full justice to do it in the printing, but it gives a fair idea of the high class of designs contained in the work. We note that The Electrotype Company are offering copies of the just finished bound volume of *The Art Workman* at the reduced price of 15/-.

The American Lithographic Art Journal is a bright weekly of 8pp. 4to. There isn't much of it, but its contents are both useful and practical, and it is excellently printed. See business announcement on another page.

Notes and Queries.

[*Through this channel anyone submitting a question upon printing or allied processes can receive an answer, either from our staff of practised technical writers secured for this Journal, or from some reader who may be better qualified to answer "special" questions.*]

* * * * *

THE following question has been suggested to show simply the character of questions which will receive the attention of the Editor.

"I have purchased my own roller and have had it in almost constant use for the past seven years. It was a good nap, and it has been used for black, but I now find that I cannot roll up the work with the fulness necessary for a good proof. Can you tell me how to remedy this?"

ANSWER: We should think that your roller has become hard. Possibly, when new, you broke it in on the old style of oil and varnish, and it has ultimately dried and hardened the skin. Or, what is more probable, you have taken too much care of the roller, and for fear of spoiling the nap you have not scraped and cleaned it thoroughly. The best course is to well wash in turpentine and scrape it; then rub in some olive oil or prepared lard; after a day or two, scrape, wash in turpentine, and roll up vigorously in medium varnish upon a clean stone; then scrape, wash, clean, and put into use again.

THE following question having appeared in an American contemporary, the answer being of value to most printers, it has been reprinted in this Journal.

S. H.—"Kindly inform me through your columns how I should proceed in this case: I have to gum 10,000 sheets of druggist's labels printed on unsized paper. The gum arabic soaks into the paper but leaves no solid coat on it. The paper absorbs twice the usual quantity of the gum arabic, and the surface of the labels has an ugly, dirty appearance."

ANSWER: Dissolve one part of alum in 5 parts of water (by weight). Then dissolve 50 parts of gum arabic in 100 parts of water, cold. When thoroughly dissolved, filter the gum, to which add the dissolved alum and a few drops of carbolic acid.

To Subscribers and Agents.

A FINE PORTRAIT OF ALOIS SENEFELDER, the Inventor of Lithography, will be presented to every agent or subscriber who sends in five subscriptions to THE BRITISH LITHOGRAPHER on or before the 1st of November. The portrait is an artistic specimen of Air-Brush work, by C. Storey, admirably printed in monochrome on fine plate paper, 20 x 25 inches in size, and is well worth a handsome frame.

Our Competitions.

IT is intended, as soon as we get into thorough working order, to institute a series of competitions amongst lithographic artists and printers, the conditions of which are under consideration, and will be duly announced.

Specimens.

[*Will our friends kindly remember to send their specimens either* TIGHTLY ROLLED *or* FLAT BETWEEN BOARDS; *the cost is but a trifle more, and for review they gain in being presented as they came from the machine. If sent unprotected, specimens are usually so crushed and disfigured as to be utterly unfit for criticism or preservation.*

THE finished excellence of the chromo work produced by Messrs. Blake & Mackenzie, of Liverpool, is well known. As horticultural printers they have an established reputation which is well sustained by the constant succession of fine designs they turn out in the shape of covers for florists' catalogues and plates of their choicest productions. Mr. J. Honeyman, foreman with Messrs. Blake & Mackenzie, sends us a number of sheets of this class of work, "just as they came from the machine," which are noticeable not only for the effective artistic grouping of the flowers and the brilliancy, clearness, and softness of the colours, but are really admirable examples of the highest class of lithographic art printing, and show that a high standard of taste and execution is aimed at in all they do.

A SELECT collection of collotype and chromo-litho. specimens from Messrs. Bemrose & Sons, Chetwynd-street, Derby, are as near perfection in artistic and technical details as it is possible to get. There are very few firms practising the former process in the United Kingdom, chiefly on account of the large initial outlay in plant and the difficulty of securing reliable and efficient assistants. A recent visit to Messrs. Bemrose & Sons' works showed that they had gone into the thing thoroughly, their photographic studio and plate preparing and printing rooms being models of excellent and complete arrangement for the purpose. The work in progress was admirable in effect and tone, and bore the closest comparison in execution with the best foreign productions. In rural and landscape views and figure subjects they excel especially, and many of the groups of porcelain, plate, etc., could not easily be surpassed. Altogether, we were fully convinced that in this new branch of illustration British printers are certain to hold their own with the foreigner. One of the collotype pictures we saw will appear in our next issue. Messrs. Bemrose's chromo-litho. work is so well known as to need no comment from us, and the specimens before us are simply first-class from every point of view.

THE handsome admission ticket to the Guildhall reception in honour of the German Emperor, designed and printed by Messrs. Blades, East & Blades, of Abchurch-lane, is a beautiful example of chromo work. The design consists of a trophy composed of the royal eagle, banners, and crown, with ovals surrounding the portraits of the Emperor and Empress, and views of the royal palace at Berlin and of Windsor Castle on the right and left respectively. At the foot are the City arms, with views of Osborne House and the Guildhall. At the sides are panels containing reproductions of the statue of Frederick the Great and the Column of Victory. The text of the card is in a white opening in the centre, the groundwork of the rest of the design being a delicate blue. The colours employed—gold, red, pink, blue, yellow, green, and brown—are in tasteful and well balanced harmony, and the technical execution of the finished character always seen in the productions of this eminent firm.

A VERY neatly written lithographed circular (4to) from Messrs. McNaughton & Gowanlock, Glasgow, announces that they have commenced business as lithographers and manufacturing stationers, at 109 Vincent-street. The circular is a tasteful specimen of its class, and, for a one-colour job, pleasingly effective.

"Our" Title Headings.

IN sending out prospectuses of THE BRITISH LITHOGRAPHER, the first thirty artist subscribers were invited, for a prize of One Guinea, to submit designs for an appropriate heading. Nine designs were sent in, all of them very good. Those from MR. P. V. MACENANEY, 14 Shandon-street, Belfast, and MR. G. JACOBS, 187 Clifton-road, Aston, Birmingham, were adjudged the best, and both have been adopted, a guinea being sent to each competitor. The latter is used on the cover and the former on the first page of text. We think them well worth the money.

SPECIMENS FROM "DESIGNS FOR GRAPHIC ARTISTS."

LONDON: PUBLISHED BY THE ELECTROTYPE COMPANY, 80 FLEET STREET, E.C.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

·&C.R. Ltd·

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OUR RECEPTION.

WE are gratified to record, has far exceeded our most sanguine expectations, and our heartiest thanks are due to all who have worked so well to achieve such a splendid result.

At the inception of the BRITISH LITHOGRAPHER, we determined to place its circulation entirely in the hands of our old and tried B.P. agents, together with the representatives of the lithographic trade Societies, the few members of the craft in outlying districts being left to the post office. The result was, as announced in the first number, that so many subscriptions were secured as to place the journal at once in a secure position.

Of the first edition, we printed **7,500 COPIES.** Of these, **5,500** WERE TAKEN BY OUR AGENTS IN THE FIRST TEN DAYS AFTER PUBLICATION, for the supply of subscribers, and the demand has since continued so steadily that it has been found necessary to almost entirely suspend the free circulation.

From the large number of congratulations on our initial number received from the craft and the trade press, we print a few extracts elsewhere in this issue, that the craft generally may see what their confrères think about it.

Whilst we are proud of the success of our venture so far, we are stimulated to make it still more worthy of the craft it represents, but to enable us to do this our subscription list must be further increased. We aim at securing the full 7,500 subscribers, and to attain this end we would urge upon every subscriber to shew his copy to friends who may not already have seen it, and endeavour to secure *one* subscriber at least. The number will thus be quickly made up, and we shall go on our way with the consciousness that our efforts will not be cramped by the necessity for enforced economy in its management.

Our readers will note that we have already begun to increase in bulk, and will also find something new in the "B.L. EXAMINATION PAPERS," which will, we hope, become a popular feature.

B.L. Examination Papers.

In our initial number we asked our friends to express their candid opinion thereon. This has brought us many flattering communications expressing approval of the plan of the journal, and two or three making very useful suggestions, which we shall endeavour to use.

We will begin with the suggestion to which we have given the title at the head of this column.

We propose in each issue to set a QUESTION PAPER on practical subjects connected with lithography and its allies. There will be two sets of questions—"Elementary" and "Advanced." One guinea will be awarded to the B. L. subscriber sending the best set of answers to *each* set of questions. The first set is intended for apprentices and young journeymen, the second for those of more advanced experience.

The judges will be Mr. S. D. Hall, teacher of the Leicester class, and Mr. Chas. Harrap, teacher of the Manchester class.

Competitors to place their initials *only* on the top right-hand corner of the first sheet of their replies, and to enclose them with their full name and address on a separate slip, in envelopes addressed to the editor of THE BRITISH LITHOGRAPHER, De Montfort Press, Queen-street, Leicester, on or before January 1st. The answers, with the initials only, will be sent to the judges, who, after adjudication, will return them to the editor for identification. The best papers in each set will be printed in the succeeding issue of the B. L., with the competitor's name attached.

We hope to see a good response to this invitation. The working out of both sets of questions will be useful practice for members of the classes.

[The second and third will each be presented with a copy of a fine portrait of Senefelder on plate paper.]

ELEMENTARY QUESTIONS.

[*Candidates must answer at least eight questions. The value of each question is indicated by the number in parenthesis.*]

1. Explain why a good writing paper can be used for autograph transfers? Is it possible to use it for ordinary transferring purposes; if so, how? (15)

2. What should be used to damp the back of an autograph transfer before putting it to stone? Why is it used? Why is it not used for other transfers? (15)

3. How is it that an autograph transfer is transferred by one run through? What is the reason for running other transfers through so many times? (15)

4. What is the nature of gum arabic? Why is chalk added to it to refresh it? How can you tell the difference between gum arabic and gum substitute, or British gum? (20)

5. Give a good general composition for a bronzing ink? (10)

6. Why are driers not added to black ink? Give the names of six materials which can be used as driers? (10)

7. What is the object of damping a transfer in the damp book? State to what extent the damping may be carried for chalk paper, copperplate transfers, and writings? (15)

8. Is there any difference between turpentine and terebene? If so, point out exactly what purposes each will fulfil? (20)

9. Name the different kinds of surfaces of the rollers used in printing? How is a glazed roller prepared, what are its uses, and is there any roller made which is a substitute for glazed rollers? (20)

10. What are the effects of overloading any ink with turpentine; of leaving turpentine or terebene swimming on a stone; and of breaking in a roller with varnish? (20)

11. Why does the cylinder of the hand press frequently refuse to draw the carriage through? What is the proper remedy? (10)

12. What effect does the moisture of the heated printing room have upon the bare stones, and why? (15)

13. What is French chalk? For etching, which do you prefer of resin, asphaltum, copal varnish, French chalk, or bronze dust? Why do you give this preference? (10)

ADVANCED QUESTIONS.

[*Candidates must answer at least ten questions. The value of each question is indicated by the number in parenthesis. A simple question well answered will secure more marks than a more difficult one answered badly.*]

1. Describe fully the composition of gum arabic, and shew clearly why it is one of the best materials which can be used for lithographic purposes? Explain how it is that gum arabic goes sour, and what precaution can be taken to prevent souring? (35)

2. What is stearine, and for what purposes may it be used? How can a substitute for stearine be readily prepared? (30)

3. How can you discover if Prussian blue, or any other pigment, has been adulterated with starch? (25)

4. Why does a pigment refuse to print evenly on large surfaces? What is added to prevent this, and why is it added? Which colours, by their chemical nature or adulteration, are most likely to present this difficulty? (35)

5. Can a nap roller be too "velvety" in the nap? What means should be employed when it is found that the rollers in the machine refuse to ink the work? (20)

6. What is varnish? From what, and how, is it prepared? Is there any similarity between terebene, turpentine and varnish? If so, point it out clearly? (30)

7. In what way can ordinary air affect the colours of a show bill, and how does foul air act upon them? (35)

8. What should be the composition of a reliable preserving ink? Why is not ordinary printing ink any use for preserving purposes? (20)

9. What is the difference between lithographic transfer papers and photo-lithographic transfer papers? (25)

10. What is the nature of the zinc-plate substitutes now in the market? Is it possible to use them for photo-lithography by any means; if so, how? (20)

11. How do nitric acid, carbolic acid, and alum act upon (1) the stone and (2) the work? What are the main uses of each in lithography? (30)

12. What is the internal action set up by mixing Flake white with the generality of pigments? (40)

Lithographic Technical Education in France.

The fact of our art being scarcely a century old is perhaps one of the causes which have delayed the appearance of journals representing the lithographic art until the present time. Typographers, bookbinders and the paper trade have been represented by trade journals for many years, and in their columns competent writers have given accounts of their researches and experience in practical work, thus imparting technical instruction.

To the best of my belief the first trade journal exclusively devoted to lithographers originated in America, and while in France there are several journals in the interests of typography, lithography, and kindred branches, there are none which are devoted exclusively to the interests of lithography, though the majority of them include in their columns articles relative to the lithographic art.

Lithography is often spoken of as being, comparatively speaking, in its infancy, but the progress made in its short career makes it compare most favourably with the sister art, and other reasons should be forthcoming as explaining the non-appearance of technical journals representing it. One of these, and perhaps the most important, is the absence of methods of instruction. As a matter of fact, lithography has not the same latitude in working as typography, and one cannot feel that even the most advanced methods of the day show the art at its full development. Men of sufficient ability, who are capable and willing to teach a knowledge of the developments of the art, are unfortunately very rarely met with. By only a small amount of reading from reliable works, and perhaps a course of carefully graded lectures, we may easily educate ourselves to such an extent that we early find there is less and less difficulty in working, less to ask about, and consequent facility to assist others. Lithographers, as a rule, write but little, and many of them are probably by no means astonished that a technical journal has not been written for their benefit. The practical workman alone is capable of explaining away the difficulties arising in work, and making plainly understood why such method, such order of proceeding, and such process are necessary towards the end in view. But such assistance cannot be obtained everywhere and at any time, and this state of apathy is most prejudicial to the general interests of lithography. Technical schools are making their appearance, but I should like to see the movement advance much more rapidly. In each department of work, masters should endeavour to see in their apprentices something more than mere machines concerned in the production of work, and daily instruct them in the theory and application of the various processes, and thus conscientiously fulfil the agreement of apprenticeship.

M. GUSTAVE SANIER.

Therefore, an organ of the class exemplified by THE BRITISH LITHOGRAPHER is most valuable, and in truth indispensable to thoughtful and ambitious workers. Doubts and mistakes may be put forth and answered in such an organ without any fear of calling down ridicule or contempt for want of knowledge, and both employers and workmen will quickly feel the effects of this interchange of opinion and study of the best work, whilst their own productions will be executed better and quicker, as a result of the proper utilisation of the journal.

My whole demand is for more and more education, and such should be the desire of all who are in any way interested in our beautiful art, and in its advancement above the simplest and most elementary of its applications.

FRENCH TECHNICAL SCHOOLS FOR LITHOGRAPHERS.—The first school established for the instruction of the art of lithography in France, was founded by M. Gustave Sanier in 1886, and is thus of very recent date. On the death of M. Sanier in the early part of 1890, the pupils then under tuition were transferred to the Estienne school, opened that year. M. Sanier was a member of the Academy from 1876. Not wishing to be accused of Chauvinism, I will leave M. Sanier to explain the reasons which led him to entertain the idea of, and to eventually found, such an institution. Speaking of his school, he says: "The speech delivered by the Hereditary Prince, now Emperor, of Germany after the fall of Paris, suggested to

my mind the advisability of instituting some form of education in Paris for apprentices to the lithographic art. One passage in the speech referred to was much commented upon by the press, where the Prince said: 'We conquered France in 1870 on the field of battle, we must now endeavour to conquer her on the grounds of industry and commerce.' This address appealed strongly to my patriotism, and brought to my mind a vivid recollection of the disastrous siege of Paris, and I resolved from that time to see to the defence of one industry,—that of lithography and kindred branches, and I conceived the plan of founding a technical school for the express purpose of furthering the extension of the lithographic art.

"The Germans believe that a good and practical school of lithography should not confine itself to the practice of the art itself, but should extend its assistance to professions allied with it. In 1798 a school of this description was founded in Vienna, and ultimately became a department of the Imperial printing office. Hamburg has possessed one since 1868, and we might also add that formed by Senefelder in Munich in 1798. These schools regularly sent out trained and capable workmen, and their influence is shown wherever good work is met with, or has to be executed by competent artists. If then it be granted that France possesses the first place in the lithographic world, it may be expected that by such schools Germany will shortly supplant her on her own ground in the execution of works of art, and not desiring such to result, and because I desire our artists to struggle against the keen competition, I wish to inaugurate such a school as mentioned."

The first attempts to realise this ambition were confronted with many difficulties, until happily, circumstances brought the scheme under the favourable notice of M. Antonin Proust, the acting Under-Secretary of State to the Fine Arts, who readily lent his aid, with the result that the scheme was ready for practice at the close of 1885. The inevitable expense caused the number of students to be limited to fifteen at the commencement.

Monsieur Sanier was at the same time manager and sole master of the school. He taught practical lithography and the various branches of drawing, painting, engraving, and practical perspective. From the code of regulations drawn up for the management of the school, I extract the following:

"Students are admitted by competitive examination which includes drawing.

"The age at admission should not exceed 13 years.

"All are day scholars.

"The hours of work are from 8 a.m. to 5 p.m.—deducting 1¼ hours for dinner. From 8 a.m. to 10 a.m., students in the third year of apprenticeship take up a course of painting; from 10 a.m. to 3 p.m.—allowing for dinner, lithographic designing is practised, and followed up with the necessary operations for concluding the work.

"For the first three years of apprenticeship, all the work is done from special studies, and with certain particular objects in view; during the fourth, the students work on orders which may be received for artistic and commercial work, one half of the amount earned being retained by the school, and the other half being the property of the student earning it.

"The term of apprenticeship is fixed for four years. All students who leave voluntarily during their apprenticeship must pay a compensation fee of £20."

Though the school had only been in existence for three years, the pupils were successful in obtaining a silver medal for their exhibit at the Exhibition of 1889, and gave much promise of turning out work of more than average ability. The death of the talented founder and instructor is a severe blow to the growing good work, and though the students have been transferred to the Estienne school, it is somewhat doubtful whether they will there receive the same valuable teaching and practical knowledge as under the late M. Sanier's instruction.

I may speak of the Estienne School in No. 3.

LYONS, *October, 1891.* A. VALETTE.

Re-Union of Dublin Lithographic Artists.

ON Saturday, Nov. 14, the members of the Dublin Branch of the Lithographic Artists', Designers', and Engravers' Society, met at the Wicklow Hotel for dinner. After having done full justice to the *menu* provided by the genial proprietor (Mr. O'Brien), there were several "toasts" proposed—"The Society," "The President," "The Lithographic Printers' Association," and "Our Guests." These were responded to in neat and appropriate speeches, and drunk midst much enthusiasm. A smoking concert followed, each member and guest contributing recitations or songs. After some more "speech-making" and "handshaking" the meeting broke up after having spent a most enjoyable five hours. A word of praise is due to Mr. Light (Walker & Co.) for his exertions in promoting the re-union, and the neatly designed *menu* card that he produced for the occasion, as well as for his skill as accompanist.

A RECENT PATENT.

LITHOGRAPHIC TRANSFER SURFACES.—J. F. Roberts, London.—The inventor's aim is to print transfer surfaces capable of retaining for long periods their capability of usefulness. For this purpose a thin, flexible, transparent, tough, and smooth sheet of suitable material is used. The sheets may be of gelatine, backed as desired by a paper support, previously rendered insoluble and waterproof by treatment with bichromatic of potash, and sometimes also with chrome alum, or of nitro-cellulose and camphor, prepared as for photographic purposes.

In two claims the inventor embraces the use of the flexible sheets, having now absorbent impression surfaces for lithographic transfer surfaces.

TO SUBSCRIBERS AND AGENTS.

Henry H. Bemrose.

·B&S·L^TD·

William Bemrose.

&C.R. Ltd.

OUR PORTRAIT GALLERY.

Messrs. Bemrose & Sons, Derby and London.

It is our pleasing duty to present to our readers the portraits of the principals of the widely known firm of Messrs. BEMROSE & SONS, Printers, Publishers, and Lithographers, of London and Derby. It will be seen that the portrait of each gentleman bears the impress of strong individuality, which has shown itself in the energy and enterprise characterising their business life, and also in the service of the public in the town in which they reside.

It was our pleasure a short time since to pay a visit to their large printing works in Derby, and we must confess to a feeling of wonderment as we passed through the many departments. Everywhere there was an air of business, which told of orders of magnitude in hand, and plenty more following in their wake. Labour-saving appliances, the newest machinery, the rapid movement of work from one department to another, told us in unmistakable terms of the time and thought, and also of the vast expenditure of capital, which it must have cost the principals in developing and consolidating so large a business, of which they are justifiably proud.

We think that before attempting to describe the works it will interest our readers to know something of the lives of the two gentlemen before us, and therefore we will give a brief record of each.

We may here say that the founder of the firm of Messrs. Bemrose & Sons was the late WILLIAM BEMROSE, who, in 1825, commenced business, after serving an apprenticeship under Mr. Henry Mozley, one of the eminent printers and publishers of that day at Gainsboro', and then at Derby. In 1857 Mr. Bemrose retired in favour of his two sons, Messrs. Henry Howe and William Bemrose, the present heads of the firm.

MR. H. H. BEMROSE was born at Derby in 1827, and in 1855 married Miss Brindley, daughter of the late W. Brindley, Esq., of Derby, and has one son, Mr. H. Arnold Bemrose, M.A., F.G.S. He has also three daughters, one of whom is married to the Rev. A. Bonus, vicar of Christ Church, Plymouth; and another is married to the Rev. C. M. Gough, vicar of Steeple Claydon, Bucks. Mr. H. H. Bemrose has always taken a deep interest in the public affairs of the town and county in which he resides. In 1871 he was elected a member of the Derby Town Council for Friar-gate Ward, and, on his election as Chairman of the Sanitary Committee, vigorously urged a scheme under the Artizans' Dwellings Act for removing some of the unsanitary blots of the town. In 1877 he was elected first mayor of the enlarged borough, and on his elevation to this dignity, the employées of the firm presented him with a magnificent illuminated address of congratulation.

In 1878 he was appointed a J.P. of the borough, and in 1879 was elected to the Aldermanic Bench. When the Derby Corporation acquired the property of the Derby Waterworks Company, Mr. H. H. Bemrose was elected and has since continued Chairman of the Committee who manage that responsible undertaking.

In addition to the many public offices Mr. H. H. Bemrose fills in municipal affairs, he is to the front in every scheme or society for the welfare of others. The following institutions amongst others claim him as taking a leading part in the management of their affairs. He is the Hon. Sec. of the Midland Institute for the Deaf and Dumb, President of the Derby Y.M.C.A., on the Committee for the Infirmary Rebuilding, the Church Army Labour Home, and the Diocesan Training College, President of the British Typographia, Member of the House of Laymen for the Province of Canterbury, etc.; and there is scarcely a philanthropic or religious society in the town or county which does not find in him a liberal supporter. He was also for some years Captain of a company of Volunteer corps. He has been repeatedly solicited to seek election for Parliament as the Conservative candidate for Derby, but has hitherto declined to do so. His oratorical powers are of a very high order, and the "cause that needs assistance" can always rely on being championed by his eloquence.

In his leisure hours Mr. H. H. Bemrose has formed a very fine library, containing some rare examples of early printed books, and possesses some of the rarest examples of the printing art executed during the last centuries. He possesses also a unique library of Derbyshire Bibliography, containing nearly every book and engraving published relating to his native county. He has also been a considerable traveller, and has only just returned from an extended journey through the United States.

MR. WILLIAM BEMROSE was born in Derby in 1832, and married in 1858 Margaret Romana, the only daughter of the late Edward Lloyd Simpson, Esq., of Spondon-by-Derby. He has five sons and one daughter, and three of his sons are taking an active part in the business.

On the occasion of Mr. W. Bemrose's silver wedding one of those interesting and gratifying events took place which betoken the good feeling existing between employer and employed, in the shape of a handsome gift, from the employées in all the establishments of the firm, of a costly silver candelabra and a Derby Crown china tea service to Mr. and Mrs. W. Bemrose to commemorate the happy event.

Although his time has been most fully occupied with the multifarious cares and duties devolving upon him in the active conduct of the printing and other departments of the large and increasing business, Mr. W. Bemrose has always been most active in the discharge of his duties as a good citizen. Although he has never sought an entrance to the Town Council, he

has nevertheless done yeoman service in divers other ways to the community of Derby. For some years he was a member of the Litchurch Local Board, and filled the chair when that important district was added to the Borough of Derby.

Mr. W. Bemrose has taken a distinguished part in all educational movements in the town, and was years ago unanimously elected as a member of the Derby School Board. He is also a member of the Free Library and Museum Committee, Chairman of the Corporation Art Gallery Committee since its formation, and also a member of the Corporation Technical Instruction Committee and of the Railway Servants' Orphanage. He was appointed a Justice of the Peace in 1885. He is also a Director of the Royal Crown Derby Porcelain Works, and took an active part in reviving and re-establishing this important industry, which is closely identified with the history of the town.

Mr. W. Bemrose has always been an enthusiastic advocate of technical instruction, along with the useful utilisation of leisure time, and found vent for his talent by early practising, with marked success, the art of wood carving, etc. Deriving much pleasure from this pursuit, and being gifted with the pen of a ready writer, he issued his first work about thirty years ago on "Wood Carving," with choice illustrations of the possible achievements of the amateur who followed his skilful directions. The book has sold by thousands, and being the first work of the kind issued did much to revive the introduction of a better style of furniture than was then in vogue. This work was quickly followed by other similarly successful works on amateur handicrafts—viz., "Fret Cutting," "Buhl and Marquetry Work," "Paper Rosette Work," etc., for which there is still a large demand. He is also the author of a large and important work, "The Life of Wright of Derby," an eminent painter of his native town, and allied to his wife's family; producing a very handsome volume—a splendid specimen of typography; and the work was criticised by the Press with considerable favour. His pen has been busy in the cause of Technical Education, of which movement he was one of the pioneers; and he has also written works on Archæological and Ceramic subjects.

He was one of the earliest members of the Volunteer movement, and served in the force for seventeen years, retiring as a Lieutenant from overwork and ill-health.

We were favoured with a visit to Mr. W. Bemrose's home at Elmhurst, and our sketch would be incomplete without a brief notice of the artistic taste and refinement which pervades his home surroundings, and which are indicative of his character and also of his pursuits when away from business. In every room there is evidence of manipulative skill in wood carving, fret cutting, oil and water colour painting, models in clay, all executed by himself, and emanating from a well-fitted workshop adjoining his residence. Mr. W. Bemrose has been a considerable traveller, and although he has not circumnavigated the globe, he has visited the four quarters of it. Egypt has been visited three times, and that interesting country seems to have made a deep impression upon his æsthetic tastes, for he has just completed the furnishing and decoration of one of the prettiest studios extant in the Arab style. Being a skilful amateur artist he has painted a series of sketches of Egyptian temples, scenery, and Arab life, which adorn the walls, and most of the beautiful carved woodwork was executed by his own hands. Much old Arab Meeresheybea woodwork has been effectively utilised before the windows. The two graceful Arab arches are supported by a fine column of Mexican onyx, with a ring of "Blue John" inserted, and have an alabaster cap and base. The colouring of the walls, etc., is exceedingly rich; Persian tiles are introduced round the divan; ornaments and curios occupy the numerous niches and arcaded shelves, and at night the room is lighted with five finely pierced Arab lamps, into which the electric light is conveyed. The effect of the whole is to give the mind a sense of the dreamy luxuriousness, and yet exquisite taste, of the Oriental home; and it also speaks eloquently of the artistic care and judgment which has so skilfully carried out the adornment of such a "gem" of a studio.

The portraits are taken from negatives kindly lent by Mr. W. W. Winter, photographer, Derby.

At the Irongate Establishment

are the offices in which is carried on all the financial part of the business, under the control of Mr. H. Arnold Bemrose. The wholesale Stationery and Drawing Office Stationery Department is also in these quarters, and a very large business is carried on with professional men, engineers, and other large mercantile firms throughout the United Kingdom.

The Letterpress Works

of Messrs. Bemrose & Sons are situate in Midland-place, near the railway station at Derby. The first building occupied was erected in 1854, but year by year there have been new developments and extensions until they have attained their present magnitude. They now comprise three large blocks of buildings of three and four stories each, covering a large area of land, and containing no less than 92,099 square feet of floor space.

As the readers of our paper will be more interested in the lithographic department, which occupies a distinct building in Chetwynd-street, some 200 yards distant, we purpose giving only a very brief description of the Midland-place Works, although these latter are the most extensive.

We find at the principal entrance a first-rate group of offices; the offices to the right being devoted solely to the railway section, and those on the left to the general, commercial, and publication sections: a large staff of clerks being employed in each suite of offices; Mr. W. Wright Bemrose having the onerous charge of the oversight and detailed working of both the Midland-place and Chetwynd-street Works. Here a daily succession of orders is received from all parts of the United Kingdom—we had almost said, the world—as, indeed, we might truthfully say. Frequent orders arrive from Australia, Africa, America, and the Continent, showing how well known and widely appreciated is the work executed on these premises. Adjoining the offices are the paper warehouses, with every convenience for unshipping the consignments of bales of paper which are daily brought in for the

consumption of the insatiable printing machines. We make our way into the first room on the ground floor, and find it filled with machines of the largest size. The machines occupy four large rooms, and the impressions turned off are numbered by millions in the course of a very short space of time. Amongst them are Wharfedale perfecting and single cylinder machines, two-colour machines, and various types of platen machines, hand presses, &c.; also a large rotary perfecting machine, capable of printing many thousand sheets of quad-royal size per hour. These machines are of the finest description, and are carefully tended and kept in the best order.

The Composing Department is also a most extensive one, and nearly 200 hands can be engaged in this department alone when the busy season is on. It is fitted with all the modern types and ornaments, and heavy founts of book types of all sizes are held, so that whole volumes can be set up at once. The quiet and order which are observed tell of system and method in the arrangements, so that the best results can be obtained in the least possible time. The stock room connected with this department is a marvel in its way. Thousands of standing forms, almost tens of thousands of stereo plates, and numerous wood engravings and other valuable blocks are stored here, and all so carefully registered that any given form or block can be instantly produced. There is also a fireproof room attached, in which all the stereo moulds and standing pages of type, book plates, etc., are securely kept. The stereo foundry and electrotyping department is most complete, having all the latest appliances; while the electro battery and bath are of the most perfect description. There is also a type foundry with type casting machines, hand moulds, &c., for casting the various sorts, furniture, quotations, leads, &c., as required.

The Binding Department is the most spacious room in the whole of the building, and here we find an army of willing workers plying their various crafts as finishers, bookbinders, pagers, folders, &c. Where machinery can be introduced it has been done, and all around are folding machines, sewing machines, blocking presses, &c., of the best makes, which show that the firm is in the front rank as regards modern improvements. Close by is a large room devoted to folding and sewing; and overhead is another filled with modern ruling machines.

We see another department in which millions of envelopes used by the Midland Railway Company and the mercantile and general public are made, and also the making and eyeletting of countless thousands of direction labels. In the same room are also employed a staff who are engaged in stamping notepaper and envelopes in artistic colours from dies.

To keep all the machinery in perfect order there is an Engineering Department, which is fitted with lathes, tools, &c., to equip it for the many calls upon it, as necessarily arise where there are so many machines, and which are kept so fully employed. There is a staff of fitters, joiners, plumbers, &c., all busy in keeping things going and making the needful alterations and improvements consequent upon increasing business.

The packing and despatching are done with rapidity and neatness, and a numerous staff is employed solely for this purpose.

Throughout their works Messrs. Bemrose & Sons have always provided the latest and best machinery and other appliances that science and ingenuity have developed. To overcome the difficulty of distance in communicating with the several establishments (in one case a mile apart), and also to place the office instantly in connection with the foremen of the various departments, a Telephonic Exchange has been fitted up in the works, with twenty different instruments, by which means several hundred messages are daily transmitted, and time and distance almost annihilated.

The Lithographic Works

are situated in Chetwynd-street, off the London-road. Owing to the development of this branch of the business it was found necessary, some thirteen years since, to provide premises specially adapted to the needs of the artistic character of the work. On our visit we could not help expressing admiration at the suitability in every way of the buildings which had been erected for securing the best light, ventilation, and other conveniences such as are specially necessary for the development of the lithographic art. The floor space of these works measures 26,175 square feet.

On entering the three-storey building, which fronts the street, we at once find ourselves in the offices, which have been recently enlarged and fitted up with all modern improvements. The walls are covered with framed specimens of work done on the premises, and comprise choice examples of chromos, pictorial show cards, collotypes, and other classes of lithography. There are also a number of original oil and water-colour paintings, which have been specially executed for the firm at great cost by eminent artists, for use in showbills, &c.

Proceeding, then, to the Artists' and Designers' Department, we find ourselves in a light, cheerful, and spacious room with a north light. Here a large staff of skilful and experienced artists, designers, and engravers are engaged in preparing for the printer all kinds of commercial and artistic printing, illustrated lists, book plates, railway plans, and pictorial show bills. The walls are covered with pictures of value, which are helpful and suggestive. There is also a valuable reference library of a variety of works on art and design.

We next visit the room where the ink used by the firm is manufactured, and here chemicals and colours of all sorts and conditions are to be found ready to be made up into any shade of ink required, by grinding machines of the best construction. Here is also a roller covering machine, which deftly performs the difficult and tedious task of dealing with rollers.

In the Machine Department, which occupies an area of 6,700 square feet, we find one section set apart for transferring and proving, and quite a small army of experienced workmen may be seen here, busily engaged in the delicate and responsible work entrusted to them. The stone grinding is also carried on close by, and manual labour is superseded by machines of the best kind to grind and polish the stones. The printing

machines are all of the latest type, and are kept busily running throughout the year with a constant succession of orders. One giant machine is specially noticeable, on which a sheet measuring 42 × 64 inches can be printed, and we saw a lovely specimen of chromo work, on a sheet 60 × 40-inches, printed in many colours on this machine. As a large quantity of work is done in bronze, Silverlock's latest bronzing machine is in full work ; and also a plate rolling machine for preparing paper for chromo work. A business-like air pervades the whole department, cleanliness of the machines and orderliness being the order of the day. The number of stones in regular use for the requirements of so large a business is simply enormous, and in the cellars, beneath the machine room, there are whole quarries of all sizes of these valuable stones.

A department is devoted to the cutting up of labels, cards, calendars, &c., and in addition to a number of guillotines there are several label cutting machines, which are constantly employed in cutting labels for some of the largest brewers and manufacturers in the kingdom. Hundreds of steel dies of various shapes are requisitioned for these orders, and are carefully kept and registered.

In the Folding and Sewing Department is a staff of busy workers engaged in the usual round of duties appertaining to this branch, and, in addition, frequent calls upon their time are made for eyeletting and cording numberless calendars, show cards, &c., which are ordered.

Another large room is set apart for gumming paper and varnishing show cards, almanacks, labels, &c., which require this treatment. Also, in the adjoining room, the mounting, finishing, and framing of these show cards, &c., are carried on, a number of men being kept fully occupied without intermission by the amount of work passing through their hands. There is a large and valuable stock of frame mouldings of all kinds kept ready for use.

Our visit to the Photographic Studio was most interesting, as we saw how complete and perfect were the arrangements made to produce the exquisite results seen in the collotype and photo-litho. processes, which we shall shortly notice. It is a large and spacious apartment, fitted with every modern improvement, with five dark rooms added for developing the numberless photos that are taken. There is also a monster camera, in addition to the ordinary ones, which is fitted to run on rails, in order to focus articles at any distance. By the skilful manipulation of experienced photographers the best results are obtained, as is evidenced by the pictures which adorn the walls of the department. Negatives are here taken of any articles, illustrations, or portraits for photo.-litho, photo-tint, and collotype processes, and here also the plates are prepared for printing the latter. The machining of photo-zinco blocks and photo-engraved blocks of the finest quality also forms a considerable part of the business. All the negatives taken are carefully registered and kept in stock. Outdoor photography is also undertaken when required. The Ferro-prussiate method of reproducing mechanical drawings and architects' tracings is carried on by a cheap, simple, and rapid process.

The collotype printing is carried on under every favourable condition in a separate department. The costly machines are specially constructed for the printing of these deliciously delicate permanent pictures, and result in the production, in various tints, of illustrations enriched with a softness and beauty which is peculiar to this newly introduced and much admired style of printing. Amongst the many choice examples we cannot help specially admiring an invitation card just executed in collotype for Messrs. T. Cook & Son, containing views in India, Egypt, and England, the card being a treasure in itself as a picture. A Winter Scene in Via Gellia, Matlock, was also extremely good, and a portrait of Senor Sarasate, the eminent violinist, was almost life-like.

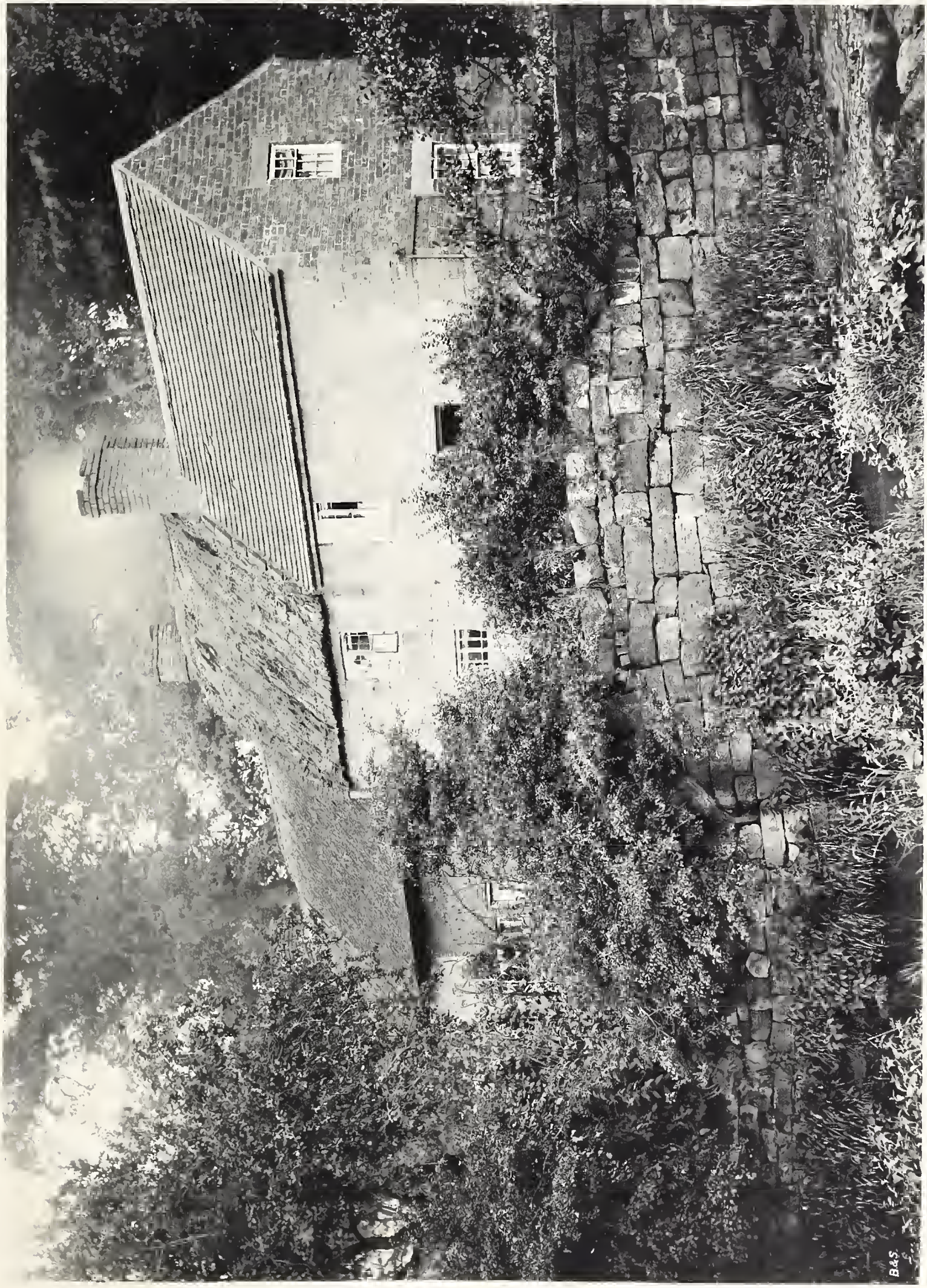
We finally visited the latest addition to this extensive lithographic establishment, and that is the Metallachrome Printing Department, in which printing direct on to the metal is carried on. Messrs. Bemrose & Sons were the first licensees for this process in England, and we predict a large business for the beautiful and chaste productions turned out. The machinery is entirely new, and includes a Sandblast Machine for graining zinc plates preparatory to printing by the metallachrome process. We have not space to describe the details, but we may say that these metal plates are specially suitable for out-door advertisements, business notices, show cards, &c., as the colours when printed are brilliant and durable, and the materials are thoroughly impervious to damp. A number of skilful hands are already busily engaged in this branch, which promises to be one of great importance, and will bring additional credit upon the enterprising firm who have secured the license.

The whole of these premises are lighted with the electric light, which is produced on the spot by a powerful dynamo. The utmost order and cleanliness pervade the works, and the warmth and ventilation of the rooms is carefully attended to, with a view to the health and comfort of the numerous workpeople.

In addition to the extensive establishments at Derby, which occupy a leading position amongst the industries of that thriving town, Messrs. Bemrose & Sons' carry on a large concern at 23 Old Bailey, London. The head quarters of the Publishing Department are situated here, and deals with the numerous magazines, literary and scholastic works, etc., for which the firm is justly renowned. All the branches of the Printing, Lithographic, and Manufacturing Stationery businesses are carried on in the premises, and as at Derby, everything betokens enterprise and efficiency in all departments. The numerous staff which is employed is indicative of the magnitude of the business transacted here.

A Fire Brigade is organised amongst the workmen, at Derby, and all appliances provided in case such a disaster should occur. Each member has his appointed duty, and training for an emergency takes place periodically, in order that the Brigade should be efficient in time of need.

Before concluding our notice of these establishments, there are several points which ought to be mentioned in order to show the anxiety displayed by the firm for



COLLOTYPE BY BEMROSE & SONS, DERBY AND LONDON.

COTTAGES AT DUFFIELD, NEAR DERBY.

the welfare and comfort of their employées. A Mess Room is provided for those who live at a distance. A Sick Club has been established for twenty-two years, which distributes nearly £300 yearly amongst its members laid aside by sickness; and in many cases, when old age, infirmity, or accident overtakes an employé, the firm makes a liberal allowance in addition, so as to prevent the "grim wolf" coming to the door. Another great boon has been in existence for many years—viz., a Savings Bank, in which the thrifty may safely deposit their savings at 5 per cent. interest, and when again wanted may be withdrawn at a few hours' notice; this bank has been much appreciated and taken advantage of. This firm was the earliest to introduce the custom of giving an annual holiday and excursion to its employées, and the past summer has seen the celebration of the 26th annual excursion. Two special trains are required for this purpose, and the seaside and Metropolis are the favourite places visited on these occasions. The railway fare is paid, and the day's wages given. The greatest good feeling prevails, as it always has done, between employers and employed; and the principals know that in the conduct of their extensive business they can rely on the intelligence, loyalty, experience, and skill of all their staff, many of whom have been engaged in their service for periods ranging from twenty to over fifty years—a striking evidence of friendly feeling and faithful service existing on either side.

Just as we are going to press we learn that the firm of Bemrose & Sons is about to be made into a private Limited Company. No shares will be offered to the public; the arrangement is being made for purely family reasons.

Mercurography.

The principles of mercurography, or mercurial photo-engraving, are simple, but may nevertheless be stated: Mercury possesses the property of attacking metals, or their compounds, to form alloys, except in the cases of iron and platinum. The amalgamated parts of a plate will not take printing ink. From these two principles Mr. Villon gives the following processes in *Le Traite Pratique de Photogravure au Mercure:*

RELIEF ENGRAVING FOR LETTERPRESS PRINTING.

Write with an ink or a mercurial pencil; immerse the plate in a hydrochloric acid bath. The parts of the zinc covered with the mercurial tracing will remain untouched, the naked zinc only being attacked. After immersion for ten or twelve minutes take the plate out of the water, rinse it beneath a tap, wipe, and treat with a solution of nitric acid, nitrate of silver, &c. Remove the mercury by rinsing with a sponge, dry with a rag and roll with an ink composed of vaseline, wax, paraffin, &c. Continue the biting, rinse under a tap, allow to dry, then ink again, powder with rosin, heat on a warm surface and proceed as in the case of gillotage until the surface is completely covered with varnish. Lastly, wash with turpentine and the plate will be ready for printing.

LITHO. ENGRAVING.

Draw with pen and ink, or mercurial pencil, ink the plate with an india-rubber roller, or, better, with gelatine covered with a litho. ink composed of wax, gum lac, linseed oil, lampblack, &c., or a good retransfer ink. This ink will take on all the parts untouched by the mercurial ink, and the drawing will appear in white on a black ground. To transform it into a litho. engraving adopt either of the following methods:

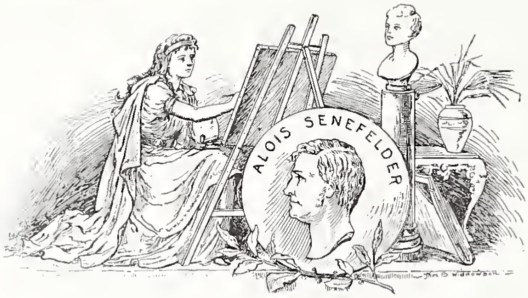
Put the plate into a galvanic platinum bath in order that it may receive a thin layer of this metal on all its uninked parts. Mr. Villon gives several ways of preparing a platinum bath. The zinc plate is put to the negative pole and a platinum anode to the positive pole. The platinum deposit should be exceedingly thin. As the platinum treatment takes place at a temperature of 50° to 60° C., the inked surface should be previously powdered with rosin, the plate being warmed so as to melt the rosin; afterwards allow to cool and varnish the back with Venice varnish.

By way of precaution and to avoid runnings, the plate should be placed in the bath horizontally. All the traits of the drawing will then be covered with platinum. Now rub the surface with turpentine to remove the ink, and place in a nitric acid bath, which attacks the parts of the zinc not covered with platinum. When sufficiently bitten rinse in clear water, and afterwards, as in zincography, sponge with a gallic acid solution, which prevents the zinc from taking the litho. black. Rub the plate with this solution until the zinc becomes bright, and then gum. A few seconds afterwards rinse with a sponge, wipe with a soft rag, treat again with the gallic acid solution; rinse, wipe, and ink.

The gallic acid may be replaced by a solution of cyanide of mercury, which will equally well prevent the white parts from taking the litho. black. The bare parts of the zinc will then mercurize, while those covered with platinum will remain unchanged. Wipe the plate, ink it, and after a certain number of proofs gum anew. In the case of copper plates mercury only can be used for "gumming."

For the second method, instead of using platinum for the uninked parts of the plate, an electrotypic deposit of iron slightly in relief may more advantageously be formed; this is a kind of steeling process. Prepare a watery solution of 1.10 sal ammoniac; pass an electric current; place an iron plate to the positive pole, while the negative wire is simply plunged into the bath. A compound chloride of ammonium and iron is thus formed. The current is continued until the appearance of the sesquioxide of iron gives a greenish tint with rose coloured surface. This liquid decomposes under the influence of light. Glass vases must not be used, but gutta percha basins, or wooden basins covered with gutta percha.

The bath being prepared, place the plate to the negative pole and an anode of iron to the positive. Allow the current to act for two or three hours. Remove the ink by means of turpentine, rinse in clear water, gum, and ink as above. The same process may be used for copper plates.—*L' Imprimerie.*



The Lithographic Classes.

AT LEICESTER.

ONE immediate result of the starting of THE BRITISH LITHOGRAPHER is the commencement of a Technical Class in Leicester, under the charge of Mr. S. D. Hall, of Derby, whose success as an instructor has been amply illustrated by the results of his work in connexion with the classes held in Messrs. Bemrose & Sons' lithographic establishment in Chetwynd-street, Derby. The inception of this class is primarily due to the efforts of Mr. C. W. Kilby, of Newarke-street, who personally canvassed all the lithographic printers in the town, with the result that at the first meeting forty-two students were enrolled, and fifteen more have since joined. Amongst those on the Committee are Mr. W. H. Lead (chairman and treasurer), Mr. E. Shardlow, Mr. H. Humphreys (Fleming & Co.), Mr. J. C. Lawrence and Mr. Robert Hilton (Raithby, Lawrence & Co., Limited), Mr. S. Drinkwater, Mr. F. Keightley, and Mr. S. Langton; Mr. T. B. Widdowson, 4 Friar-lane, acting as hon. sec. The class meets on Wednesday evenings (commenced November 4th) at 8 o'clock, in the Ellis Technical School, Highcross-street. Fees, 5/-; apprentices, 3/-.

At the preliminary meeting for the formation of the class, held at the Granby Coffee House, there was a good attendance. Mr. W. H. Lead, who was voted to the chair, in the course of a vigorous speech, said there was no doubt we were far behind our continental neighbours as regards technical education. The want of technical education was beginning to make itself seriously felt, not only in our own but in most other trades. Our raw material, in the shape of workers, was the best in the world, and it only required moulding into proper shape to retain the old supremacy of the Britisher for quality as well as quantity. We must not sit still and let our foreign rivals walk over us. He hoped a good class would be formed, and carried to a successful conclusion.

The resolution constituting the class was then proposed and carried, and the committee named above—five employers and three employés—elected.

The chairman then introduced Mr. S. D. Hall, who explained the methods of working the class, enumerated the heads of the different subjects to be dealt with, and with some stirring remarks recommended to the students present a close study of the technical literature and journals of their craft.

Votes of thanks were given to Mr. Lead for presiding, to Mr. Kilby for organising the class, and to Mr. Hall for coming from Derby to attend the meeting, and the proceedings terminated.

The class now numbers 56, and is so far the largest lithographic class in the kingdom. The committee of the Ellis Technical School have kindly given the *free* use of a suitable room in their institute.

LIVERPOOL TECHNICAL CLASS.

ON account of the backward condition of the building at the new central buildings of the Liverpool School of Science and Technology, at 21 Islington Flats, close to the Walker Art Gallery, the opening night was postponed from Monday, September 28th to October 5th. The class for lithography was opened by the teacher, Mr. Honeyman, on Thursday, October 8th, there being a fair attendance of members of the craft. The room measures 31 × 21 ft., and is in every way suitable for the work, the comfort of students having been a prominent feature in all the arrangements. The lighting and ventilating have been executed by the well-known firm of Messrs. Sugg & Co.; the heating throughout is by means of hot water pipes; the desks, cupboards, benches, etc., have been made according to special designs, and executed by the North-Western Educational Trading Company, Liverpool.

Mr. Honeyman, in his opening address, said that the importance of technical instruction had been recognised by the Liverpool Corporation, and the claims of the School of Science and Technology had been acknowledged, which, in his opinion, marked an important period in the history of Liverpool artisans; hitherto the work had been carried on under the most trying circumstances, and although the wants of the school and of the teacher are not as yet entirely satisfied, still sufficient has been done to encourage them in their work, and to imbue them with a feeling of confidence that the prejudice entertained, and against which they had to contend, is rapidly disappearing. Lithography enters into almost every trade and business, it is the medium through which, to a great extent, the success of large firms in various industries is due, and, therefore, it is important that the eminence attained should in no way be allowed to depreciate. The object of the evening classes is to enable lithographers not only to sustain their position, but, if possible, to excel all previous efforts. He did not wish to convey the impression that technical education, as taught at the evening class, would prove a remedy for all the difficulties which may arise in the workshop, but he believed that the man who studied the technicalities of his trade was less likely to have trouble, and when it did arise, would be able to deal with it more effectively than the man who worked by rule of thumb only. There are men who have, through the medium of technical books and periodicals, improved their condition and knowledge of their business —but the process in many cases has been slow—the man generally getting beyond middle life before attaining the necessary qualifications to enable him to act as manager or foreman. Still such men are invariably found occupying good positions either as

foremen or first-class workmen, receiving more than the average remuneration for their labour. Many a young man at the expiration of his apprenticeship knows very little of the fundamental principles of his trade. Of course we know that most of the knowledge and experience which makes good workmen is gained after apprenticeship days are over. The majority of men in large litho. shops at present are specialists, and have generally enough to do looking after themselves without troubling about the apprentice, who finds it no easy matter to gain information from men who are always fully occupied. By attending the evening class for one session only, he will receive such instruction as will be valuable to him for the remainder of his life; but there are some young men who seem to think that having served the required apprenticeship, and being entitled on that account to journeyman's wages, further study is not required; such men must awake to their condition, and prepare themselves to be able to turn out good work or bear the consequence. Mr. Honeyman then dealt with the principles upon which lithography is based, and the chemical composition of the stone. At the conclusion of the lecture a number joined the class, and at the time of writing (the second class night) a total of twenty students were enrolled.

At Derby

A Lithographic Class was commenced on Monday, October 26, in the Derby Municipal Technical College, Green-hill, the instructor being Mr. S. D. Hall, of Messrs. Bemrose & Sons' lithographic establishment. About a score of students have joined. The following gentlemen form the Local Committee:—Mr. W. W. Bemrose, Mr. F. E. Bemrose, Mr. H. M. Hobson, Mr. W. Bacon, and Mr. J. Peach, with Mr. M. Prince as hon. sec.

In London

At the Polytechnic Institution, Regent-street, Mr. W. Layton Wilson, the instructor there, reports an encouraging increase in students—between thirty and forty at date of writing—and every promise of a successful session.

Artists *v.* Printers.—At the first meeting of the Leicester Class—and we hear the same has occurred elsewhere—objection was made by some of those present to the presence of artists in the class, on the plea that "they would take away the printer's work." Considering that the artist's is by far the best paid, as well as the lightest work, the plea is somewhat farcical: it would be a new thing for a better class of workers to take up the work of others who are not paid so well. This would be "advancing backwards" with a vengeance. It would be well for both if artists and printers had a better understanding of each other's methods of working. Better work would be produced to begin with, and there would not be that constant friction between the two departments there is now. It would be better also for the employer from an economical point of view: there would not be so much inferior and spoiled work, and the output would be larger. Jealousy of each other is not the best way to make progress.

Another Class Wanted.—We hear that a Lithographic Class at the People's Palace in East London is very much desired by many who reside in the neighbourhood, but that the Manager (Mr. Osborn) doesn't move in the matter, "because he has received no applications" about it. We venture to suggest that a notice put up at the entrance of the Institute, or inserted in the Palace Journal, would soon convince him that there was need of his taking such a work in hand, and there would be no difficulty about a teacher. No doubt Mr. Wilson, who conducts the "Poly." class, would be willing to take it in hand. There must be hundreds of lithographers—journeymen and apprentices—living in the neighbourhood to whom such a class would be a great advantage. Couldn't a few of them get up a requisition to the Committee, asking for the establishment of a class. We feel sure Mr. Osborn would give his assistance as soon as he saw they were in earnest. Mr. Alexander would also, no doubt, be willing to lend a hand in the matter. Who will make a beginning?

That Beer Money!—As the session just commenced is the last to which the City and Guilds of London Institute will afford pecuniary assistance, managers of technical classes everywhere should approach the local authorities—Corporations or County Councils—with a view of obtaining a share of the Government Grant for Technical Education. In some places—Liverpool (by the Corporation) and Aylesbury (by the County Council) for instance—this has already been done. It behoves them to be on the look-out early, otherwise the money may be differently disposed of.

Granulated Paper.

The following recipe for granulated paper will be found of value to all interested: Take some sheets of strong, unglazed paper; make a mixture of clear starch; strain it through a sieve, and, by means of a brush, spread a layer evenly on the surface of the paper; then leave it in the air to dry. Afterwards place the paper thus treated between wet sheets, in the same manner as if it were India transfer paper, in order that it may become slightly damp. Put a stone on the press and place the paper on the stone, face upwards; take a cloth, the texture of which is more or less close, according to the grain to be obtained; give a moderate pull at the press, and, finally, leave the paper to dry again in the air. This process, which is quite elementary, places the litho. printer in possession of granulated paper ready for the draughtsman.

After a long connection with the production of shippers' tickets in various firms in Manchester, Messrs. Cowburn & Struggles have started in business on their own account, in Manchester, and are prepared to undertake the drawings of chromo work, illuminations and general lithography.

The Drexel Institute of Philadelphia has decided to inaugurate a school of lithography, for apprentices and young journeymen.

Preservation of Drawings on Lithographic Stones.

AN Austrian journal has published an article in which the author gives a description of a process by which, he claims, originals may be produced after a lapse of many years. His process requires that a photo-lithographic department be connected with the lithographic establishment.

Those who know photo-lithography are aware of the fact that, in order to obtain a reproduction, a good negative is required. In case a negative is to be stored away for further use, it should be made as follows. From a stone containing a transfer or engraving a good impression is made, with a solid black ink, upon good transfer paper, and this impression is at once transferred upon a white sheet of gelatine or upon parchment paper coated with gelatine. In case the design is a large one, it may be divided into sections. When you have obtained a perfect and clean transfer upon the gelatine, mount the same on a drawing board, as you would common drawing paper, and by means of a broad and soft hair brush, cover it with a solution of aniline brown. The coat of aniline should be without any streaks. When dry give a second coat, or pour the aniline solution upon the transfer, thereby obtaining an even layer of aniline colour. Instead of aniline brown you may use aniline black, &c., but the solution must be clear and transparent and absorb the light. After the aniline colour has dried, wash off the printing ink with a few drops of turpentine and a tuft of clean cotton. Then take the gelatine transfer from the drawing board, when it will show a beautiful and clear negative, which is perfect in its smallest details. Imperfect transfers may be at once washed off gelatine sheets with turpentine, and those sheets may be used again. Such gelatine negatives may be preserved for any length of time by placing them between the leaves of a book, but will keep better still if you varnish them. It is best to use a white turpentine varnish for the purpose, add some siccative, and give the side containing the transfer a coat, and then the reverse side. This coat of varnish has the advantage that it protects the negative against humidity and prevents folds and wrinkles.

To obtain an impression from such a negative you must resort to photo-lithography. A glass case is always to be had in a lithographic establishment; the same must be covered with a double layer of some yellow material (paper, muslin, &c.), and not an aperture must be overlooked though which any light may penetrate. You also need several quart bottles, a funnel, a tin bowl, a copying frame and paper. According to a certain formula, the chrome bath is prepared in the tin bowl, and after bathing the paper therein it is suspended in the glass case, fastening it on top of some blotting paper by means of two pins.

Let the paper dry over-night and make your copies in the morning; they take from ten to fifteen minutes. For developing use the same bowl, and the copies are ready for the stone.

Seeing the beautiful aniline negatives, the question arises whether or not all type printing and drawings might not be preserved in the same way; and we say that it is possible. Suppose you have to compose a book of many pages; you may set up four pages at a time, make a sharp impression upon transfer paper, which is at once transferred to gelatine, and then prepare the aniline negative. In this manner the publisher may set up many hundred pages with very little type, and preserve the aniline negatives. The printing is done on the lithographic press, and another advantage arises therefrom, for the photo-lithographic printing is far superior to the typo-lithographic printing.

Zincographic transfers may thus be entirely dispensed with, for pictures can at once be transferred to the stone with reading matter, and colour printing for books might be cheaply introduced.

Drawings, designs, and writings may also be put directly upon gelatine films, or with crayon after it has been grained with sand. Such drawings, designs, &c., may at once be changed into aniline negatives; the original is exactly reproduced upon the stone, which is of the utmost importance to such artists as do not consider photographic reproductions as satisfactory.

"Plant Form" Supplements.

IN accordance with the announcement in our initial number, we present in this issue the first of these supplements—the popular "Lilium Auratum," the finest of the liliacæ order. Under cultivation it attains gigantic growth. A specimen was exhibited at the Folkestone Art Exhibition in 1886 which had 475 blooms, and the year after the same plant produced 500 blooms. Another, grown near Wolverhampton, and acknowledged to be the finest ever seen, had 24 stems, stood 8 feet high, and was 26 feet in circumference.

The colour of the flower is usually ivory-white with a stripe of yellow down the centre of each petal, increasing in depth as it gets to the middle of the flower. Each petal is studded with innumerable dark rich crimson spots, the largest being in the centre of the flower. The stamens, which are five or six in number, according to the number of petals in the flower, have heads of a deep yellow, inclined to orange. The stem is of a pale olive-green when young, and darkens as it grows older. The flowers, as is well-known, exhale a lovely perfume, which, where there are a number of the plants in a close atmosphere, becomes somewhat sickly, and is to many persons, almost unbearable.

Paper Impermeable to Water.—A recipe for manufacturing a lithographic paper absolutely impermeable by water and of great suppleness is given as follows in the *Chronicle Industrielle*:—"13-lbs. of gelatine are dissolved in a bath of 13-lbs. of glycerine with 1½-gallons of water, and while the mixture is constantly kept warm by means of a wet bath the paper is immersed in it. On being taken out of this bath the paper is soaked in another composed of about 3-lbs. of bichromate of potash dissolved in 1½-gallons of water, after which it is exposed to light."

PLANT FORM.—NO. 1.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

·G·C·R·L^TD·

By Charles Harrap.

CHAPTER I.

Lithographic Stone, its Composition, Qualities, and Defects. Where Found. The Geological Formations in Germany, France, Algeria, Italy, and England.

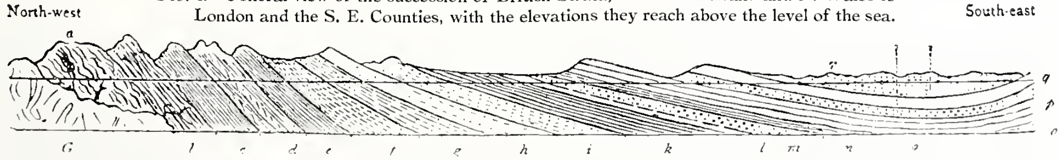
The lithographic stone, though varying in colour from a light cream to a dark slate, has generally a constant composition. Stones of the finest grain have from 95 to 97 per cent. of carbonate of lime, the remainder being carbonate of magnesium, silica, alumina, oxide of iron, and faint traces of bituminous matter. The lithographic stone when broken should show a smooth, clean fracture, otherwise the grain is coarse and the quality low. From the time of its discovery the stones from Bavaria have been most highly prized. The district from which they are obtained extends along the river Altmuhl, which joins the Danube at Kelheim—notorious for its piece of Kelheim stone by which Senefelder discovered the art of lithography. The Altmuhl flows near the quarries of Pappenheim, Solenhofen, and Eichstadt, whilst the River Isar, upon which Munich stands, is considerably to the south-east of these places, and joins the Danube at Deggendorf.

A glance at the position of lithographic stone in the earth's crust, with a surmise as to the probable mode of its formation, will readily show some of its characteristics.

The lithographic stone is a "limestone," and like the other members of that extensive class of rocks, has a very finely granulated structure. It was this fine granulation, similar to fish "rows," which secured for the whole limestone strata the general term of Oolitic or Egg-like rocks. The position of the lithographic slate, although not represented by any great beds in England, is yet marked in this country with sufficient distinctness to enable us to compare the rocks with those on the Continent. In the world's history, it was sometime after the coal measures had been laid, and had been successively covered up by the Magnesian limestones, Lower "Red and Mottled" sandstone, the Triassic beds of pebbles, conglomerate, dolomite, marl (with rock salt and gypsum), and the beds of Lias rocks, with the new red sandstone, through which the Manchester Ship Canal is cut, that the lowest members of the Jurassic System were deposited.

The convulsions which had formerly shaken the earth, and the subsequent denudations and earthquakes, had calmed down into a series of alternate quiet denudation and upheaval, sometimes with fresh water, at others with brackish, and at others with salt water overlying. It was thus that the sixteen distinct layers of the Lower Oolite were put on, and the formation reached which includes the lithographic stone. In England the Middle Oolite lies upon the Cornbrash beds, and itself includes the Oxford Clays and the Coral rag; immediately above, the Upper Oolite includes the Kimmeridge Clay and Portland Stone. It is quite unnecessary to put down absolutely which is the bed similar to and contemporary with the lithographic slate, suffice it to say that it is one of the beds between the Portland stone and the Cornbrash, and is most probably the Coral Rag, which is the English representative in course of time of lithographic stone. The actual designation of the Continental stratum which contains the lithographic slate being Terrain Corallien, schistes de Nattheim, calcaire à nérinées. The occurrence of a fossil of a two-shelled mollusc allied to Chama in the Alps, leads us to suppose that the Oolitic bed in the Alps corresponds with the Coral Rag in England. Turning to the position of these rocks on the face of the earth, it is noticeable that, at one time, the Strait of Dover and the district must have sunk deep down into the earth, and all the strata have been tilted up from that point, both in an easterly and westerly direction. The chalk of Dover Cliffs is a later deposit than the Oolite, and the same chalk can be found cropping out at Epernay, some miles east of Paris. Going westward from the London clay, we come across the chalk, then a hilly outcrop of Upper Oolite: further on, the outcrop of the Middle Oolite, still further, the Lower Oolite, and then we reach the Lias beds at

Fig. 1.—General view of the succession of British Strata, from Cumberland and N. Wales to London and the S. E. Counties, with the elevations they reach above the level of the sea.



G, Granitic Rocks; *a*, Gneiss; *b*, Mica-schist; *c*, Skiddaw or Cumbrian Slates; *d*, Snowdon Rocks; *e*, Plinlimmon-rocks; *f*, Silurian Rocks; *g*, Old Red Sandstone; *h*, Carboniferous Limestone; *i*, Millstone Grit; *k*, Coal-measures; *l*, Magnesian Limestone; *m*, New Red Sandstone; *n*, Lias; *o*, Lower, Middle, and Upper Oolite: *p*, Greensand; *q*, Chalk; *r*, Tertiary or recent Strata.

Cheltenham. From Paris, going eastwards, the same series of outcrops can be observed; the chalk at Epernay, the outcrops of Oolite at Verdun and Etain, and the Lower Oolite cropping up on the edge of the plain at Metz. Such similarity of formation leads us to suppose that if lithographic beds are found in that portion of the Jurassic System which outcrops in the Monheim district, there should be lithographic stone all along the Oolite, which stretches in a south-westerly direction from Bavaria, along the Jura mountains, and probably touches all the eastern provinces of France, cropping out in northern Italy, travelling under the sea by way of Corsica and Sardinia to the north of Africa. These surmises are borne out by facts, for there are in use in many old French lithographic establishments stones taken from the quarries in Ain thirty years ago. Those stones are of excellent quality, whilst more recent ones are less veiny but not so compact. The district from which these stones are quarried lies along the banks of the Rhone and its tributary, the Ain, which embrace the southern spurs of the Jura mountains, and at Creys in the lower Dauphiné. There is very little doubt as to the similarity of these and the German stones, for the French geologists, J. Iter, Drian, V. Thiollière, Falsan, and Dumortier agree as to the character of the stone; whilst the German geologists, Waagen, Bronn, and Voltz, in describing the fossils of Solenhofen, give exactly the same examples as are to be found in the Jura quarries. It has been shown that the imprints of fish—known as Gololithes or Lumbricaria—which have been well known in the German stone, have also been discovered in the Schists at Armailles, and find representatives at Quenstedt in the Jura. Further evidence as to the identity of the beds can be produced in the fact that Jules Iter has discovered at Orbagnoux the fossil of a cephalopod, which is common to German lithographic stone, whilst Falsan and Dumortier have discovered a fine wand of Cidaris Caranifera, which has been examined by M. Gotteau, the palæontologist, who places it amongst fossils of the Upper Jura formations, whilst it is also found in German "stone." Radioles or rootlets of this same sea urchin are to be seen in the geological collections at Munich and Sorbonne, and they are said to be taken from the chalks at Stramberg. This coincidence demonstrates very closely the analogies which exist between the layers of rock in the German quarries and the formations of the Upper Jura. So conclusive does this reasoning appear, that there is not the least doubt as to the existence of great beds of lithographic stone in the Jura mountain district. The geological character of the hills and valleys from Oensingen, in the S.E., by Ballsthal, Münster, Rameaux to the N.W., exhibits successive outbreaks of the upper, middle, and lower Jurassic rocks, which must include layers of the Oolite Corallienne, Coral rag de la Chapelle, Couches d'Argovie, and Marnes Oxfordiennes, one or all of which contain the lithographic slate. The natural forces resulting in the formation of these Jura mountains have produced three distinct lines of rocks, the lower one (Middle Oolite) stretching along by Kelheim and Pappenheim; the second (Upper Oolite) appearing around Nuplingen, in Wurtemberg; and the third (Chalk), including the chalk formations of Cerin, Armailles, and Ordonnes, in Ain, and to the north of the Dauphiné mountains.

In 1866, M. Valette tells us, during an excursion to the environs of Ceyzériat and Jasseron, in Ain, he picked up a fine specimen of stone, which, after the usual polishing, looked so well as to be mistaken for German stone; he also states that stones taken from the middle beds of the Bugey schist contain a certain amount of bitumen. This came out clearly when the stones were polished, and more so when put into use. The little black spots detected in the stone's surface made themselves apparent in a long run, by the ink persistently sticking and printing upon the paper.

"Stones" of good quality are obtained from the Cormoranche quarries, and are so compact as to challenge comparison with the German "stone."

From the quarries of Vigan, in the province of Gard, in Southern France, stones are obtained which bear the strongest possible resemblance to the stones of Ain. They are compact, fine, and of very good colour, somewhat of a dark-grey, and are equal to the best products of Solenhofen.

M. Valette has obtained specimens of stone from Lezinnes, similar to those exhibited in the Paris Exhibition of 1889, which are similar to and contain all the defects of the white variety of Munich "stone." He further narrates that on a recent visit to Algeria he came across a river, whose banks were apparently similar to the banks of the Isar, in Bavaria, where Senefelder procured his first lithographic stone. This was in the province of Oran, between Mascara and Saida, and from information received from a printer in Batna (Algeria), there is evidence that this printer has been using stones for a number of years which have come from a quarry in the neighbourhood.

Beds of lithographic stone are not only to be found in this belt across Europe, but specimens have been obtained from Sweden, others from Canada, and, passing southwards, others have come from Missouri State and the West Indies. It is accepted that English beds have given a few useful stones.

In following these beds attention has to be paid to the character of the fossils occurring in the marls which separate the layers of stone.

The fossils which are plentiful in the stones and marls at Ain are less so in those of Vigan, and finally disappear from those in Oneglia and Liguria, in Northern Italy. Want of fossils is often a sign of age, and the stones in Italy may have been of an earlier date, or what is more likely, that special circumstances of which the traces are now lost, existed to drive the animal and vegetable life northwards, for there is no lack of fossils in the lithographic stone itself of Germany. In this connection of the strata with Italy, it may be noticed that the earthquakes, characteristic of the Peninsula, seemed to have tilted the lithographic stone formations in an angular direction, varying from 18° to 75°, without breaking them: such a state being accounted for by the presence of the layers of soft yielding marl, which have probably prevented the upheavals doing much damage. The lithographic stones from the Impero Valley, in Italy, are large, and have been quarried in an oblique

direction, whilst the stones of Switzerland have been so cracked as to be utterly useless. These Swiss stones are probably the counterpart of the English Portland limestone ; a similar bed having been quarried for many years past in France, under the name of Châteauroux.

Having thus marked out the qualities of the stone and the districts where it is to be found, it is necessary to show, as far as lies in our power, under what conditions these stones were formed. The fossils found in lithographic stone do much to guide us in this direction, and the conclusion is, that the mixed carbonates of lime and magnesium, in a very fine state of division, were deposited from the waters of a quiet sea or estuary, and lay at the bottom as a fine chalky loam, in which fish, reptiles, molluscs, plants, insects, and even birds were imbedded. Where this fine powder came from is more than human knowledge can discern. There seems to be a connection between this wonderful deposit and the last few formations which had collected upon the earth's surface. Imbedded in lithographic stone are to be found little silicious nodules and innumerable spots of pure chalk. It is the fineness of the stone and the fineness of anything it may contain which leads to a supposition that the fine carbonate of lime was the last material which settled down from the waters of a current—a sea current through a strait, or a river—and this view is confirmed by the presence of fine particles of bitumenous material, which have been washed along by the current flowing over the coal measures, and finally deposited with the lime and magnesia. This theory may also account for mere films of iron being occasionally found in the stone and causing it to split in its horizontal direction. During the progress of formation the waters of the current must have been disturbed, for we find that the layers of lithographic stone are separated by layers of marl, frequently containing nodules of iron. Years upon years must have elapsed whilst these layers of stone and marl were being alternately deposited, and, finally, the cause of this peculiar formation gradually changed its chemical composition ; the deposits then became Portland limestone, and the later beds of purbeck oolite, clay, gault, greensand, chalk, etc., of which stratum after stratum was formed, each adding its weight and pressure on the lithographic stone to give it the compactness with which we are so familiar. It is impossible to conceive of the earth at this stage not being shaken by earthquakes, however slight. Some stones contain direct proof of having been broken across, one part having slipped down several inches, to become again firmly connected and used in the press with this "fault" so apparent. Similar cracks have been formed and filled in with a silicious and limy mixture, coloured by the marl and iron, and thus form the hard veins so often met with.

The veins, though hard — and known as the strongest part of the stone—are foreign matter, and resist the grinding and polishing in a greater or less degree, and in printing are frequently the cause of white lines across tinted grounds. On the contrary, the soft white spots in a stone, are so readily etched out and ground out as to decrease the value of the stone very considerably, for they also cause holes in the printed work. The fine deposits of iron in stone are amongst the most frequent causes of stones splitting and shaling off, and the bituminous dots cause ink to adhere where not required. The last fault of which mention need be made, is the presence of large silicious nodules, appearing like crystals, upon which the ink will not adhere.

As already alluded to, the fine deposit of the lithographic limestone has imbedded many forms of life ; the little specks of pure chalk may themselves be the shells of minute molluscs. If we glance at the whole period of the Jurassic history it will reveal some, if not most, of the wonders of geology. It was during this period that the species of Ichthyosaurus and Plesiosaurus flourished in the waters, and the terrible Pterodactylus flew about like a bat, with its long bill armed with rows of teeth. A flying lizard too has left us evidence of its existence, and the jaws and other parts of two marsupial mammals have been unearthed.

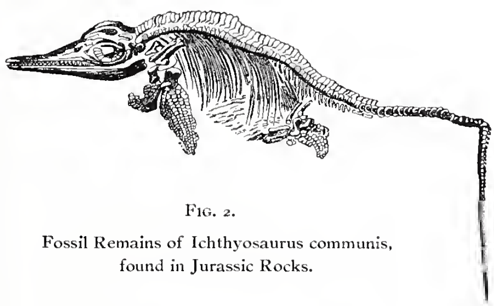


Fig. 2.

Fossil Remains of Ichthyosaurus communis, found in Jurassic Rocks.

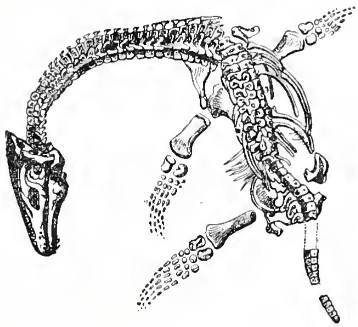


Fig. 3.—Fossil Remains of Plesiosaurus macrocephalus, found in Jurassic Rocks.

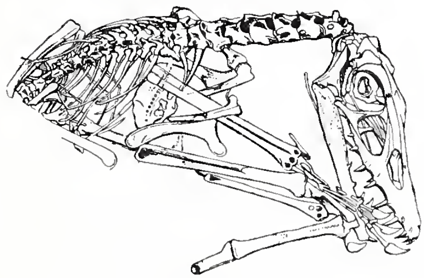


Fig. 4.—Fossil Remains of Pterodactylus crassirostris, found in Jurassic Rocks.

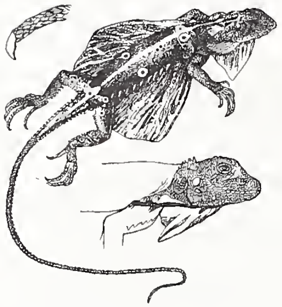


Fig. 5.—The Draco volans or Flying Lizard of the East Indies, the only known representative of the fossil lizards of the Jurassic Rocks.

Fig. 6.—Fossil Remains of Molluscs or Shell Fish, found in the Jurassic Rocks.

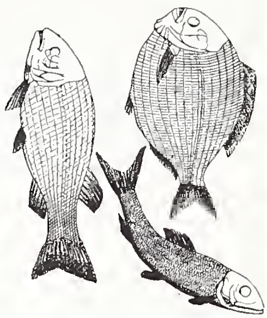


Fig. 7.—Fossil Remains of Fishes found in the Jurassic Rocks.

Fig. 8.—Fossil Remains of Ammonites or Nautilus (1, 2, and 3), and Belemnites, (4) with guard and ink bag (7) with animal partially restored. (Cuttlefish).

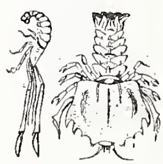


Fig. 9. Fig. 10.
Mecocheirus pearcei, Eryon arctiformis, found in Jurassic Rocks.

Another reptile was also living in those ages—namely, the Teleosaurus. Fishes of the Ganoid and Ophiopsis types were present, whilst molluscs and zoophytes can be found in abundance. Of the soft-bodied sea animals there are remains, known as Belemnites, which seem to indicate the existence of such animals as cuttle-fish, and the large coiled shell of the Ammonite, shows the predominance of a Nautilus, little different to the present species. Ferns still existed, although much reduced from their gigantic dimensions in the coal period, and the screw pine, with its aërial roots, though not found in fossil form, has left its fruit amongst the fossils of the period. More closely related to the age of lithographic stone, it is found that ferns, cycads, and cone-bearing trees grew then, and probably some species of palm. Small insects, bees, butterflies, and dragon-flies are to be found, and ocean animals not previously known—such as Ceteosaurus and Geosaurus—became fossilised in the rocks. This Ceteosaurus, a huge crocodile, whale-like in dimension, is in all probability unmatched in size or strength by anything ever upon the earth. Another curious little animal, not much larger than a crow, was the imperfect flying Ramphorynchus. Another reptile, the Teleosaurus, which was noticed before, became more abundant ; it, too, was like the Gavial, of India, about thirty feet long, with jaws which would open six feet wide.

Less imposing animals are to be found in the stalked sea-urchins, which look like lilies, and are often appropriately designated, as Encrinus liliiformis; and the Zoophytes, which then as now built up coral reefs, can be detected in the formation all through, so much so in one part as to earn for it the name of Coral Rag.

This brief survey of the geological characteristics of the whole Jurassic period may be fittingly concluded in the words of our great English geologist, Sir Charles Lyell, who says:—"The celebrated lithographic stone of Solenhofen, in Bavaria, belongs to one of the upper divisions of the Oolite, and affords a remarkable example of the variety of fossils which may be preserved under favourable circumstances, and what delicate impressions of the tender parts of certain animals and plants may be retained where a sediment is of extreme fineness. Although the number of testacea in this slate is small, and the plants few, and those all marine, Count Münster had determined no less than 237 species of fossils when I saw his collection in 1833, and among them no less than 7 *species* of flying lizards, or pterodactyls, 60 *species* of fish, 46 *species* of crustacea, and 26 *species* of insects. These insects, among which is the Libellula, or dragon-fly, must have been blown out to sea, probably from the same land to which the flying lizard and other contemporaneous reptiles resorted.

"In the same slate of Solenhofen a fine example was met with in 1862 of the skeleton of a bird almost entire, with the exception of the head, and retaining even its feathers. This valuable specimen is now in the British Museum, and has been called by Professor Owen, Archæopteryx macrura. According to his interpretation it was a true bird, and not intermediate between a bird and a reptile, as was at first imagined. It was about the size of a rook, and differs from all known birds in having two claws belonging to the wings, as well as in the structure of its tail." Sir C. Lyell continues to elaborately discuss this peculiarity of the bird's tail; but it is sufficient to sum up by stating that, whereas living birds' tails are composed of united vertebræ, this bird's tail was in twenty separate bones, each bearing a pair of quills, and forms as it were one of those transitional links in Darwin's great chain of evolution.

SUGGESTION FOR A CALENDAR.

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CHAPTER II.

The Stone—its Preparation, Treatment, and Substitutes.

PREPARATION.

The stone, as received from the quarries, usually has its two faces and edges in a rough state; and it is the custom of dealers to have them polished on one or both faces before finally delivering them to the users. Much depends upon the accuracy of this first preparation; and to prevent accidents it is always advisable for the purchaser to have the stones ground on both sides, and carefully measured, to be certain that the faces are parallel—that one end is not thinner than the other, and that there are no large hollows on either side. No amount of packing or soft bedding will make up for hollows in a stone.

The old hand methods of grinding are to a great extent superseded by machinery. The various mechanical appliances are worthy of a little notice here, owing to their varied excellencies and shortcomings.

One of the earliest machines was the revolving plate, upon which the stone is turned face downwards and is moved laterally by being clamped in gearing, worked from a cam or eccentric at the centre of motion. Sand is dusted on the plate, and water sprinkled on occasionally; more sand and water are added as required. It is easily observed that in a machine of this pattern the large plate revolves at a greater speed at its edge than at the centre, or, to put the matter numerically, if one grain of sand occupies the centre point of the revolving plate, then at a distance of six grains of sand from the centre, there will be at least 36 grains of sand on the circle at that distance; therefore whilst the stone is being ground by the one grain of sand at the centre, another portion of the stone is ground by the passage or contact of 36 grains. Of course the lateral movement of the stone compensates in a degree for this difference, but it does not by any means entirely overcome it. The final result is, that the edges of the stone are ground down and the centre is left in a mound. The same result will be obtained in all machines where the revolving plate is large, and in every case the stone has to be finished by hand.

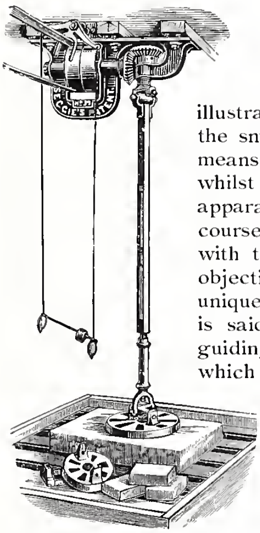
A partial improvement was made with a machine in which the stone was placed face upwards in a carriage, which moved from end to end, whilst the revolving plate—still large—was arranged to travel across the stone in an opposite direction to the traverse of the carriage. The same defect, only in a much smaller degree to the foregoing one, has to be overcome by hand finishing, except with the smallest stones.

Latterly, a much better machine has been successfully worked, in which the travelling carriage, and travelling plate have been combined, the plate being of a smaller diameter than either of the others, and for all practical purposes this machine should meet the necessities of all large stone grinding.

But in large works, where stones of all sizes are in constant requisition, many men are constantly engaged in grinding stones by hand. For this purpose there are several popular methods, each having its own merits.

The system which seems most economical, is to grind two stones at once by turning them face to face and revolving one upon the other. The only drawback to this is the weight of the stone which has to be moved, and the chances of it slipping off in the act of grinding all the surface equally.

This difficulty has been partially met by using a circular iron plate with a handle near its outer edge. The plate is revolved upon the stone, and can be guided all over the stone very adroitly. In this, however, only one stone is ground at a time, and much power is lost in the act of turning the plate round.



Mechanism has again been brought to bear upon even this "hand" method of grinding. Messrs. Seggie's machine, as shewn in our illustration, is one which combines the small revolving plate, with a means of keeping it in motion whilst the grinder guides the apparatus over the stone. Of course, it is easy to find fault with the best arrangements, and objections are raised against this unique labour-saving machine. It is said, that when working and guiding it, there are positions in which the moving axis is at an angle, sometimes a rather oblique one, and at such times the "inner" edge of the plate grinds with greater force than the outer. Even allowing this to be true, it is but a minor difficulty, and is easily overcome.

Having ground a stone thoroughly, it should be tested by a printer, with ink and turpentine on a rag, with which the stone should be "rubbed up" all over. If any ink catches, the grinding must be continued until the grease is absolutely removed. This testing may be left until the polishing is in progress, or said to be completed. The small expense of time in this preliminary testing saves many vexatious hours afterwards.

A thoroughly ground stone is finished, either by polishing with a block of pumice stone, or "grit stone," or rag, the latter for preference, because it is keen, without being rough and leaving deep scratches in the face. The final polish is put on with the Water of Ayr stone. There are occasions when a polished stone requires to be very highly finished, and for this purpose, it should be thoroughly burnished with bathbrick dust, or pumice powder, or with chalk and a chamois leather or flannel.

The preparation of stones, for grained or chalk drawings, will be fully dealt with in a subsequent chapter, in which the whole process of chalk drawing will be described.

The finished stone, after the polisher's final touches have been given, should be dried before being put on end on the floor. This is effectively done, by first allowing a stream of water to wash its surface, whilst the little grits are rubbed off with the hand; then put

warm water on, until by evaporation the surface is left clear and dry. Such a stone is ready for immediate use. According to the means at disposal, so can the stone be dried. A ready method is to blot it "surface-dry" with paper,—tissue-paper for preference, because it does not leave bits on the surface, and when used in half-quires folded, can be readily dried and used over and over again. After this the stone may be dried against a steam chest, or open fire. However careful a stone has been washed and dried, there is always a fine film of lime upon its surface. For heavy work, this is not of much consequence, but when a draughtsman has to execute work of any degree of fineness upon it, its presence is a serious barrier to good or expeditious work. The fine dust fills the pen, causing broken and uneven lines, clogs the brush and thickens the ink. To remove this before beginning to work, the stone should be thoroughly rubbed with chamois leather, flannel, or paper, until the filmy streaks have been removed. A reliable test, for a clean stone, is to place a sheet of paper flat upon it, and with the ends of the fingers move the sheet about on the surface, when the smallest grit will be readily perceived, and it is not until the sheet almost refuses to be moved, that the stone can be considered clean enough for fine work.

[*To be continued.*]

The Royal Female School of Art Exhibition.

A REPRESENTATIVE of the B.L. paid a visit to this exhibition on Saturday, October 31st, and was both pleased and interested with what he saw. The work of the students—past and present—on view, showed that they had not only been well trained technically, but were possessed of artistic taste and a right appreciation of the beautiful in art. The visitor is struck at once with the very high average of excellence of the exhibits as a whole, and this first impression is borne out by individual inspection of the works.

Miss Horton, who gained the National Prize Medal, with a skilfully designed and effective water-colour sketch, would have carried off the silver medal but for the absence of outline.

The Gilchrist Scholarship of £60 per annum was won by Miss Mabel Hake, with a set of three drawings from nature, showing great care and study.

A very effective and well executed study of hands and feet by Miss Whiteside, gained the National Book Prize.

The "Special" National Silver Medal was gained by Miss Hake for an extremely well executed and very carefully delineated drawing of a group—Indian fan, peacock feathers, and gold vase. A very meritorious piece of work.

Miss Cornish's study of flowers in water colours showed talent well deserving the prize—the Clothworkers' Scholarship of £30—which was awarded her.

A clever piece of work, harmonious in tone and subtlety of colour,—a group of music books and fiddle—gained the National Bronze Medal for Miss Wenney.

The sound judgment and ability shewn in Miss A. Adam's drawing, well deserved its reward—a Scholarship.

A specimen of design for lace work by Miss Giles, showed decided talent for this class of art.

A clever drawing of "Lady Disdain" by the eminent lady artist, Mrs. Jopling, was accompanied by a lithographic copy of the picture, and attracted much attention.

"Her Majesty's Navy," a set of ten drawings by W. Christian Symons, are very good, and the lithographic reproductions shew careful work.

The drawings of "Animals" (lithographs) by Stephen T. Dadd shew skilful grouping, and good effects in light and shade.

Commendable work is shewn in four drawings (lithographed) for "The Birds of the British Isles," after A. Thorburn.

Last, but not least, two chromos, "Morning," and "Evening," produced by the pupils and published by the Fine Art Society, are not only rich in colour and effect, but admirably produced.

The Life Class deserves great credit. The subjects, one and all, are worthy of much praise. Not only skill, but good judgment is displayed. In this class the Queen's Gold Medal was awarded to Miss Falcon, and Hon. mention to Miss Whiteside.

Two water-colour sketches from nature by Miss Kemp, gained her the First "Vocation" Prize. Clever productions, shewing care in every detail.

Two half-tone "Process" blocks are also shown which have appeared in the *Art Interchange*. One is the portrait of Mrs. Rhoda Holmes-Nicholls, a former student of the school, receiving the Queen's Scholarship. She afterwards worked in Rome and Venice, and during her stay in Rome, was made a member of the Roman Water Colour Society, a great distinction seldom or never conferred upon a lady artist. Mrs. Nicholls went to America in 1884, and in the spring of that year exhibited at the Society of American Artists.

Much of the work shewn in this Exhibition comes from the Chromo Lithographic Art Studio, 24 Gloucester-street, Queen-square, W.C., which is in connexion with the Royal Female School of Art, under the presidency of Sir Philip Cunliffe-Owen. The school possesses a large and complete lithographic establishment in which its students are employed, is established on a thorough trade basis, and does not compete in prices with the legitimate trade. Students have to pass the technical examinations of the City and Guilds of London Institute.

AN improved process of photographic reproduction, called "Aristotypie," has been successfully practised at Dusseldorf, by Liesegang Brothers; also at Kronenberg and in the Institute of Geldmacher, at Frankfort-on-Main. The minutest details which may be perceived in the negative are transferred to aristotypic paper, landscape effects by this process being remarkable for their vividness and fidelity.

AT a recent meeting of the Manchester branch of the Lithographic Artists' Society, Mr. John Wilson was elected to represent that branch for the ensuing year upon the Manchester and Salford Trades' Council.

Mr. Louis Fagan on Engraving.

A LARGE and fashionable audience assembled in St. George's Hall, Langham-place, on Tuesday, October 20th, to hear the first of a course of lectures on "The Art of Engraving" delivered by Mr. Louis Fagan (of the department of Prints, British Museum) the subject for the evening being "The Early English School of Line Engravers," Strange, Woollett, and Sharp — the whole being illustrated by photographic reproductions by the oxy-hydrogen light. By the kind permission of Mr. Fagan we are permitted to give our readers the following extracts.

The lecturer began by describing the tools of the engraver and their mode of operation, and shewed a copper-plate press, and the mode of printing from the engraved plates, which in a technical journal like this need not be described. Then he gave a brief historical sketch of the beginning of plate engraving, of which the discovery or invention was still a disputed question, and spoke of its introduction into England, which is said to have been about the year 1545 and by one William Rogers, who practised the art in the time of Queen Elizabeth, of whom there is a portrait extant engraved by Rogers. He attained some considerable perfection in the art, his best work being a portrait of the Emperor Maximillian.

After him, in note, came John Payne, who may be justly considered the father of the art. He was born in 1608, and was a pupil of the well-known engraver, Simon de Passe. Payne is said to have been the first to practise the long line in engraving, as well as using the needle, and brought it into repute; some of his works shew this clearly, and are far in advance of any of his predecessors.

W. Hollar, who was born at Prague, but ultimately became a naturalised Englishman, was one who gave great impetus to this early art. He settled in London about the year 1637, where he did some fine work, mostly portraits, amongst which was that of his patron, Lord Arundel, copies of which are very scarce now. Robert Gaywood was a pupil of Hollar's, but by no means equal to his master. He engraved a portrait of Mary Queen of Scots, which was much admired at the time.

After having briefly noted the styles and characteristics of these early engravers, Mr. Fagan proceeded to speak of the high art engravers of their age mentioned in the programme, commencing with the celebrated Robert Strange, a name to be highly honoured in the engraving art. Strange was born in the Orkney Islands about the year 1721, and was educated at Kirkwall. Shewing some talent for drawing, he was sent to Edinburgh and apprenticed to an engraver of the name of Cooper, whom he was with for some years. The civil war in Scotland breaking out at that time, he joined the Jacobite party, and strangely enough was appointed engraver to Prince Charles, the Young Pretender, and executed a portrait of him with the initials of C.P.R., a copy of which is in the Print Room of the British Museum. This portrait established his reputation as one of the rising engravers of his day, but being complicated with the Pretender, he escaped to Paris, and there completed his education as an engraver under Le Bas. Reappearing, he established himself in London, where he became an engraver of some eminence.

Strange afterwards visited and studied at the schools of Rome and Paris with great diligence, becoming an expert figure draughtsman as well as an engraver. His principal works were copies of the old masters, such as Guido, Titian, Raphael, &c., all executed in the highest qualities of line engraving (several specimens were here shewn on screen). He also executed some powerful portraits after Van Dyke, notably that of Charles I. Mr. Fagan pointed out the beauties of his style, particularly referring to the treatment of the face and hands, so delicate and transparent, and the beautiful flowing lines in the shadows. Strange was knighted in the year 1787 and died in 1792.

W. Woollett came next in rotation. He was born at Maidstone in 1735, of humble parentage, and began to practise drawing at an early age. He was apprenticed to an engraver of the town, where he commenced to learn his art by engraving pewter pots (called in those days "cups"), dogs' collars, &c., but having an ambition above such work, he managed to get to London, and became an earnest student at the St. Martin's-lane Drawing Academy. He acquired some repute as an engraver, and was principally employed by Alderman Boydell, for whom he engraved the plate "Niobe," a very fine work; but his best work was "The Death of General Wolfe," after West —upon which he was engaged for two years. He engraved some of Richard Wilson's best works, and was the first to give landscape a place in engraving. Mr. Fagan highly commended his fine technic, though inferior in drawing to Strange. It is said of him that when he had finished a plate, he celebrated the event by firing off a small cannon on the top of his house. He died in 1785, leaving his widow in very straightened circumstances, and no wonder, as he is said to have had twenty-one children!

William Sharp next engaged the lecturer's attention. He was born in the Minories in 1749, and was the son of a gunmaker. Obtaining a premium from the Society of Arts he was apprenticed to an engraver named Longmate, whose business it was to engrave card plates as well as door plates. Making a drawing of the old lion, "Hector," at the Tower of London, he engraved it and exposed it for sale in the shop windows, which brought him some reputation. Leaving Longmate, he began work on his own account in the higher branches of his art. He copied some of the old masters, and engraved Guido's "Doctors in the Church," "The Ecce Homo," by the same artist, and the celebrated portrait of John Hunter. He had much in common with others of his school.

In conclusion, Mr. Fagan said he deemed it necessary to impress upon his audience the fact that line engraving was not, as it was generally supposed to be, a mere mechanical operation of copying; and that a good engraver should combine several qualities even

beyond the painter. In the first place he must have the capacity or genius for the art, and secondly he must be a thorough figure draughtsman, and he should also be a colourist, as he is required to give effects of colour and the delicate tints appertaining to colour with the graver. It is therefore useless to suppose engraving to be a secondary art or even to be classed with attempts by processes to obtain such results. By such means, they may imitate much with effects of light and shade, but never to the extent of line engraving.

Mr. Fagan's next lecture will be on "Etching and Etchers." P. B. W.

The Adulteration of Colours.

PART II.

MADDER LAKE.—This lake is often adulterated with a dye, either red or rose-coloured, made from Brazil wood; violets are sometimes mixed with Prussian blue, and the lakes from Brazil wood. When the tint is a dark one, the black lakes of logwood, cochineal, sumac, and gall-nut are often found mixed with them. The pure-red and rose-lakes do not tinge either cold or boiling water, and show very feebly when placed in ether and alcohol, but if the deep-coloured lake contains santaline it will then tinge ether with an orange-red hue, and if it contains carmine-lake it will strongly dye pure water, while the effect will be heightened by heat.

MADDER.—Any adulteration of this colour may be recognised by boiling a small quantity of the suspected matter in a weak solution of carbonate of soda, then put it through a strainer and wash well. If the resulting filtered alkalive water be coloured it may be inferred that the madder has been adulterated with some dye, the nature of which may be discovered by placing a few drops of ammonia on the lake; if the tint is a cochineal one there will be no decomposition.

CARMINE.—When pure, the colour is very clear and bright. The same proof for examination as for madder.

VERMILION.—This is obtained by a combination of sulphur with mercury. The proper proportions and qualities of these two bodies make up a strong and solid vermilion. This colour is sometimes adulterated with lead, the red oxide of iron, sulphur of arsenic, chromate of basique lead, baryta, etc. To ascertain the degree of purity, put a small quantity of the powder on a plate and treat it with a few drops of nitric acid, if it changes colour it is because some clayey substance is mixed with it. Another simple method may also be used. Being given that the vermilion is insoluble in water and will rest at the bottom of a vessel containing water,—put a little of the powder into a glass of water, and if the water shows any soluble matter in it then there is evidence of adulteration. In the chemical analysis a small quantity of vermilion is put into an earthenware vessel, heated, and the vermilion forms a sublimate, while any remainder will rest at the bottom and indicate the presence of such impurities as lead, oxide of iron, sulphate of baryta, white lead, minium (red lead), or of the ochres.

LAKES.—The Venetian or Florentine lakes should be bright and clear in colour. The citron and the vinegar ought to keep firm in tone. The red and violet lakes are adulterated on a large scale with aniline dyes, the kind noticeable at small dealers' stores, and which lose their brightness when exposed to the light. The test for blues, as explained below, will also act for these colours.

BLUES.—Ultramarine is adulterated with Prussian blue, which may be detected by putting a little of the matter suspected into a solution of lime-water and leaving it there about an hour. Lime-water does not act upon ultramarine, but changes the Prussian blue into yellow citron. Ultramarine may be destroyed by the use of acids, and when treated with nitric acid on porcelain, changes to a jelly of a greyish yellow colour, and as cobalt and Prussian blues are insensible to the acids, this is a means of detecting their presence in the ultramarine. The cobalt appears as violet in artificial light. So as to recognise the presence of aniline colour in milori and mineral blues, note the fracture caused by breaking off a portion. The breakage ought to exhibit a bright clear colour, and a smooth and polished surface. Place it on a plate and moisten with spirit of wine, and if, on touching it, the blue tinges the finger, it may be inferred that it contains aniline, and it may be further noted that it loses its brightness and strength on exposure to the light. In this manner it is easy to examine the ultramarine, Prussian, and other blues. Prussian blue should never be mixed with colours containing alkalies.

ANILINE COLOURS.—During the last twenty years the colours obtained from pitch have caused a complete revolution in the use of colours, and these products are employed everywhere at the present time, though even yet their proper employment is by no means fully understood. It is very necessary to the printer that he should avoid the "truck" of the so-called colour makers who take advantage of the general ignorance on the subject to place in the market only cheaply-made and non-lasting colour, in fact mere temporary substitutes for true colours.

THE INFLUENCE OF HEAT ON CERTAIN COLOURS.—Some colours undergo sensible changes if the temperature is raised at all; the orange passes to red; the chromates of lead and yellow turn to sombre orange; and the iodide of silver to a yellow-orange colour. The heat decreases as the reflection of light emitted by the colours. Under the influence of cold the chromate of lead takes on a greenish tinge, while vermilion and sulphate of mercury appear with a brightened tint.—Translated for THE BRITISH LITHOGRAPHER from *L'Imprimerie*.

THE members of the American Association of Lithographic Artists, etc., and Engravers are about to contribute a sample of each one's work to be bound in a single volume and exhibited in the Columbian Exhibition next year.

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The Rise and Progress of Lithography in Britain.

By Philip Butler Watt.

In tracing the history of the Art of Lithography from its first crude beginnings up to the present time, it must be remembered that there were two periods or epochs in Senefelder's inventions, viz., that of the etched and engraved stone period, invented about 1796, and that of the stained stone or "chemical" period, invented about 1798—the Lithography as practised to-day, and which was named by Senefelder "Chemical Printing," which it undoubtedly is. Be that as it may, I make use of the term to distinguish it from the etched-stone process which he first used. No doubt this stone printing process was known to M. Abbé Schmidt, a learned professor of the academy at Prague, to whom, amongst others, has been ascribed the merit of the invention of the art; he is said to have made use of a process of stone printing by which, in some way or another, he printed sheets of botanical drawings for the use of his students. But Senefelder appears to have known nothing of such a discovery, nor did either of them lay claim to the discovery of the etching qualities of the "Kehlheim" stone, which appears to have been used by them both.

There is no doubt that the first employment of stone for impression purposes must be relegated into obscurity. The idea, however, of producing relief on stone by the action of an acid is very ancient, and many specimens of this mode are to be found in various museums of the world. There exists in the museum at Munich an astrobel or cross staff made and etched by an acid process, and bearing the date of 1586; as also in the Museum of Antiquities in the same city is a large round table made of this same Kehlheim stone, upon which is represented in relief—and evidently by an acid process—the portraits of some of the Dukes of Bavaria, with various inscriptions; and in the Church of Notre Dame in the same capital are various Kehlheim stone monuments with the inscriptions—acid bitten—bearing date 1709.

It was in the year 1799 that Senefelder received from the King of Bavaria the exclusive right to practise his new art in Bavaria, and made no very great secret of it, as under this act of justice he considered he was quite safe, not thinking it necessary to make any great mystery of the art he had begun to propagate, and together with his friend Gessler commenced music-printing, and similar work. He also instructed his two brothers, Theobald and George, in the mysteries of the art, and they assisted him in his work in Munich. After a while he joined M. André, of Offenbach, who became his partner, and there continued printing music for some time. M. Stroffer, who had been an apprentice with his brothers, went to Stuttgart, and communicated much of the art to Baron de Cotta, who, being of a scientific turn of mind, took a great interest in the new art and founded at Stuttgart a lithographic establishment presided over by Stroffer and M. Rapp. In this establishment many new ideas were put into practice, as for instance the art of engraving on stone, which was carried up to a perfection little known in this country. I mention the name of de Cotta here, as he afterwards attempted to establish a place in London for this engraving process, but with little success. In the meantime, the art continued to flourish in its birth-place, Munich, and it was natural that the city where the art was invented should be the place where it was to be practised with most success. M. Mitterer, a professor in the school of design there, who had established a lithographic class in the school, did much to improve the art, and is said to have invented the chalk process and also the lithographic crayons for working it. But this is hardly correct, though M. Mitterer might have improved the methods and processes, for he was in a favourable position to do so, as in the school of design there was a chemical laboratory and mechanical workshops wherein experiments could be made and carried out. In the latter place was made the improved lithographic press which for a lengthened period was *the* working press of many establishments in Germany.

As the art developed it spread into all countries, Belgium, Holland, Italy, France, &c. Establishments were formed in all places, and particularly in France, for, notwithstanding many obstacles, it there took hold of the artists of the day. Mr. W. Simpson, of the *Illustrated London News,* himself a litho. artist of celebrity, in a paper lately read before the Society of Arts, gives the names of some of the more noted artists who patronised the art at that time, but as our purpose is mainly to deal with the introduction and history of it in this country, we pass on to that period.

It was in the year 1800 that Senefelder and his partner, André, made a journey to London to open an establishment in England, as nothing was then known of the art there; but let me give you in his own words his account of the event, taken from his "History of Lithography":—"I returned," he says, "to Munich, where I resigned my presses and whole establishment to my two brothers, Theobald and George. M. André had preceded me, partly on private business and partly in order to make himself acquainted with the mode of obtaining patents, as one of our principal speculations in England was the application of lithography to cotton printing. My stay in London was not the expected success as regards the establishment of a lithographic office there. The principal cause was the unnecessary precaution and anxiety of M. André who kept me during the whole time of my stay in perfect seclusion, for fear of losing the secret, and thus seven long months elapsed even before the first step was taken for obtaining our object. My patience being exhausted and the patent obtained, M. André being sufficiently instructed in the art, I had not the least inclination to prolong my stay, and returned

to Germany." However, says Banks, it was not a "patent" that Mr. André obtained, only a "caveat" in the patent office, to secure the advantages of the exclusive exercise of the invention to himself, but he took out no patent, as understood, lest the process should be discovered by the specifications he would be obliged to make. It is possible, however, that this was preliminary to taking out a full patent, which was certainly done in 1801, and can be seen at the Patent Office in London. M. P. André, son of the partner, being now left with the business, began to communicate the capacities of the new art to most of the eminent artists in London at that time, obtaining from them many fine drawings on stone, which he proposed to publish in numbers at half-a-guinea each. But some circumstances compelled him to return to Germany,

Philip H. André,
The First Polyautographic Printer in England a.d. 1801.

and he had to leave the business and the speculation to a Mr. G. J. Volweiller, who had been an apprentice of Senefelder's, and was therefore competent to conduct the business in England. Accordingly, a series of numbers were published under the title of "Polyautographic Drawings" by eminent artists, which included amongst others those of the following:—Benjamin West, P.R.A., H. Fusilli, T. Barker, Sir Robt. Potter, H. Delamott, J. H. Sherries, H. Harell, H. Singleton, etc., etc. A complete set of these drawings is to be seen in the print room of the British Museum in first-rate preservation, and they are certainly marvels of lithographic art at its early stage, and will well repay the lithographic student to inspect them. They are mostly in brush and chalk. It has been said, and perhaps so understood, that the process known as "chalk work" was introduced into England at a later period, which is evidently an error, as there are in this collection several specimens of early chalk work dated 1802-1804. Though they are crude and rough, they are wonderful specimens of the art under the crayons of such names as B. West, Fusilli, etc. There they are—with all the identical touches of the master, those rapid effusions of the brain — those spirited first thoughts never, perhaps, realised in the finished drawing! On looking at these specimens of the early Art of Lithography, one is apt to regret that the old masters were not acquainted with it. What a rich inheritance might have descended to us if it had been so! It is impossible not to feel how much benefit would have been derived to the fine arts if some of the old masters' drawings could have been multiplied by lithography and thus universally diffused.

This work of Volweiller's had a very confined sale, and the art was unfortunately far from being in a fitting state to obtain great success. M. Volweiller being greatly disappointed and disheartened, returned to Germany in 1807. It may be amusing to our readers to notice the circular that accompanied the issuing of these drawings to the public,—the first introduction of Lithography into England,—and further to note what was charged in those days for lithographic printing. The circular in question is addressed "to artists, amateurs, and gentlemen," and calls attention to the merits and advantages of the Polyautographic Art (for it had become a fashionable and acceptable process of multiplying drawings). The advertiser offered to send a stone 10 × 15 inches, with ink, chalk, and instructions how to proceed, and to print fifty impressions from the stone, for the modest sum of £1 11s. 6d. (paper extra).

At this time, as already observed, lithography may be said to have been wholly lost, or at least neglected—though it was practised at the Quarter-Master General's Office at the Horse Guards. The Government had obtained permission to practise the art for the purpose of making copies of maps, plans, &c., of the seat of war, and the administrator of that department having secured the services of Mr. J. D. Redman, who had acquired some little knowledge of it under Volweiller at André's establishment, undertook the management of this Government work. Harding had also established a press of his own, which, by his card now before me and dated 1816, was at Queen-street, Golden-square, London. He also issued a circular to artists, amateurs, and gentlemen, but considerably reduced the prices of the materials, offering to send ink, stone, and crayons, and print twenty-five copies for 18s. 6d. (paper extra). His clients, however, were mostly of the amateur type, who produced nothing artistic, and thus it became quite neglected. The application of the art to the printing of plans or maps was not favourable to its encouragement,

although it was a means of helping to preserve it to the country.

About 1806 Mr. Ackerman, an art publisher, had his attention called to the art and began to work it, and is said to have much popularised it. Mr. Rodolph Ackerman was a most extraordinary man in more ways than one. He was born in Stolberg, in Germany, and came to this country at a very early age, being originally a designer and modeller of carriages—whatever that is—but ultimately started printselling, at 91 Strand. From thence he removed to 101 Strand, and revived a drawing school which had previously been held there by a Mr. William Shipley. He also founded a business for artists' materials, supplying some of the first-class artists of the day, who also used to frequent his studio and drawing class. He appears to have taken a great interest in the new art of lithography, and from his position as a publisher as well as printseller, he had many opportunities of inducing artists to use the new lithographic crayon. Amongst them was Prout, who did a series of views for him in 1817, and through him and others raised lithography to its position as a fine art. He not only translated Senefelder's work on lithography, which was published in 1822, but made a journey to see him and to compare notes, receiving the latest information about the art. Mr. Ackerman was also a publisher of all kinds of illustrated works, needless to enumerate here. Suffice it to say he managed to employ as much of lithography as he could, being therefore a benefactor to the art, for much of its subsequent success may be attributed to his personal emulation of the progress it was making in Munich. Amongst the many uses he made of it may be mentioned one of an interesting character, and one that may have led to its being utilised in a somewhat similar manner and at a very recent date. He had views of the Rhine and other favourite resorts drawn in chalk and printed, being then transferred to the tops of fancy boxes, such as glove boxes, jewel boxes, desks, etc. These views were transferred to the cases with varnish in a humid state, and afterwards varnished all over. This idea, no doubt, was the precursor of the fancy transfer processes, variously called "Decalcomania," "Diaphania," and other fancy names. Ackerman's became also the principal and only depôt for lithographic materials, in which they did an extensive trade as the art grew and prospered. It may also be interesting to know that lithographic stones were sold at 6d. per pound irrespective of size—though large sizes were not known then—and all other materials in proportion.

We now come to one who undoubtedly did much to further the lithographic art in England. I refer to Charles Hullmandel. He was a German lithographer, who, in order to improve in his art, visited all the lithographic establishments in Germany and became intimate with Senefelder himself. Coming to London in 1818, he commenced as a lithographer, but his work at this early period of his labours was not what it became latterly, being somewhat crude and unfinished. He published, in 1818, some Italian views in chalk, twenty-four sheets, drawn and printed by himself, and shewing some little improvement on the André period, but this was not until he had visited Paris and received instructions from Engelman, in 1821, who was at the time the principal lithographer in France. On returning to London, his methods and productions greatly improved the art, and contributed much to his after success. In a little book he published "in reply to some statements," an answer to some anonymous critic who had disputed his claim to a process of facing the lithographic stone, he says:—"I claim the honour of having contributed much towards introducing fine art lithography into England—for it is true that Senefelder and André attempted to do so; but let any fair person compare attempts that were then made with the highly finished productions of Ward, Harding, and Lane, and if they are at all acquainted with the difficulties of lithographic printing, they will allow that these artists would never have produced such admirable specimens] unless they

CHARLES HULLMANDEL.
Drawn by G. B. BLACK.

had been printed by me. Of course, I am only speaking of lithography as far as concerns the production of real works of art." This, though a little egotistical in its style, is somewhat true, for he was in every sense a lithographer; not only could he draw, but he could etch and print and practically do everything connected with lithography. His works are very numerous; some of his chalk printing has never been excelled even by the works of to-day. "The Rivals," drawn by Lane, A.R.A., was at the time considered one of the finest specimens of chalk work ever produced; and one has only to look at the collection of drawings of J. D. Harding printed by Hullmandel, which are to be seen in the print room of the British Museum, to judge what lithography was in those early days and ask what progress has been made since then up to the present time, at least in chalk work.

[*To be continued.*]

Photo-Mechanical Lithographic Printing Processes.

CHAPTER I.—Photo-Lithography in Line.

By commencing these papers directly with a process, it is with the idea that either the reader is an accomplished photographer, or has a friend upon whom he can rely for good negatives, or—as is most probably the case—that the reader has heard of the process and is desirous of learning its details from mere interest, with the view of seeing how far his ways and means will allow him to indulge in this successful photographic printing process. In the course of this paper it will be seen that it is presupposed the reader is unacquainted with the smallest details, and the indulgence of those who are already well initiated is claimed for entering so minutely into the matter.

Much will depend on the quality of the paper used upon which the transfer composition is to be coated. It must be hard and well calendered, so much so that the possibility of stretching is reduced to a minimum. Experiments have been conducted with paper used for this purpose, and the results shew that with a sheet of paper upon which the first coatings have been laid, in sensitizing, drying, exposing, inking up, drying, and damping previous to transferring to stone—the sheet expands or contracts with each operation. The final dimensions shewed an increase in length and breadth of $\frac{1}{16}$ of an inch, the original paper being $23\frac{1}{16} \times 17\frac{1}{4}$ inches.

The peculiarities of paper depend upon its manufacture, and in all machine-made papers there is a greater liability of it stretching in one direction more than the other. This can seldom be determined in the sheets of paper as purchased, and to meet this difficulty care must be taken to cut all the paper in the same direction, especially if preparing a series of photo-transfers of a subject in colours, or the sections of one subject which the "plate" is too small to take at one operation, and has to be patched up from two, three, four, or more sectional transfers. Such cutting may be greatly facilitated if all the sections can be cut from one large sheet of transfer paper. In choosing paper, it should be close grained and with the cross-lined "wove" watermark, rather than the parallel lined "laid" paper.

Having selected a suitable paper, the next operation is to entirely fill the pores of it and produce a smooth, firm surface. There is a certain amount of difficulty in securing this even face, and, as already mentioned in the introduction, Professor Husnik has made it a part of his business to supply paper already coated, which only requires sensitizing to make it ready for use. But to prepare paper throughout, the first process of putting the surface on is accomplished by coating twice with a gelatine solution compounded of:—

Nelson's Amber Gelatine	3-ozs.
Sugar	$\frac{1}{4}$-oz.
Water	40-ozs.
Chrome Alum (20-gr. solution) ...	1-dr.

The gelatine is soaked in cold water until it swells and becomes quite soft; the sugar is added and the remainder of the water. This mixture is then put into a jar, the jar is placed in a pan (saucepan) of cold water over a stove the heat of which can be so regulated that the gelatine is gradually dissolved. When dissolved, the chrome alum is stirred well in and the whole is strained through muslin into an earthenware or porcelain dish kept hot by standing in hot water in a larger dish or zinc tray. The paper, which for convenience is rolled up face outwards, is held in one hand and allowed to rest upon the surface of this warm solution. The gelatine solution causes the paper to curl soon after touching it, and the curled edge is taken by the other hand and lifted from the solution whilst the remainder of the paper unrolls from the other hand and receives a coating of gelatine. The coated sheet, now unrolled, is reversed and allowed to again pass over the solution. By repeating this process, the paper becomes sufficiently covered, and is pinned up by its corners to dry. When dry, the same series of coating operations is performed, and the two coats thus put on should be sufficient to secure the smooth firm face to the paper, without any traces of the web or watermark. When dry, it is well calendered. This paper is in the same condition as that prepared by Professor Husnik, and can be kept for some time. It is in better condition after a week and remains in good condition for four or five weeks, after which it is liable to deteriorate.

The coated paper thus prepared may be sensitized in several ways, the first of which is to float it upon a mixture of:—

The whites of	4 eggs.
Water	4-ozs.
Bichromate of Ammonia (saturated solution)	2-ozs.

The whites of the eggs are put into a bottle with a number of broken pieces of glass, and the water is added. The whole is well shaken and the bichromate is added. After the shaking has thoroughly cut the albumen up and mixed it with the water, it has to be well strained. An easy and effectual method is to place cotton wool in the neck of a glass funnel and pass water through it to prepare it for the albumen solution. This water is drained out and the albumen solution poured through the funnel into another bottle. It may be strained a second time for security. The solution is poured into a flat dish and the paper floated on it for not more than five minutes.

Instead of this sensitizer, the following one, which is very simply compounded, may be used:—

Bichromate of Potassium	1-oz.
Water	20-ozs.

Upon which the paper is floated for three minutes, and dried in the dark.

Whichever method be adopted, the subsequent process is the same. After sensitizing, the sheets must be uniformly dried, and for this purpose they are hung in a drying cupboard constructed as shewn in the illustration (Fig. 1) on next page. The sketch shews a cupboard of such dimensions that sheets of royal paper

DESIGNS FOR MENU CARDS. FROM HEIM'S "ALBUM LITHOGRAPHIQUE."

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

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may be hung therein. The upper part may be of wood, resting upon an iron plate, with its edges flanged downwards, and supported on strong iron legs. This iron tray, inverted, has a fume funnel fitted in to carry the fumes clear of the cupboard. The cupboard door has a window let in, and a thermometer is placed within against it, so that it may be read from the outside or inside. To prevent baking the paper, ventilating holes may be put at the foot of the door and in the roof of the cupboard. The sheets, attached to slips of wood, are rested upon ledges near the top. The heat is applied by a gas stove underneath, and should be capable of regulation, so that the temperature does not exceed 80° F.

The processes of sensitizing and drying must be conducted in a dark room. The light may be either gas or paraffin, or the window should be covered by a yellow blind totally excluding white light.

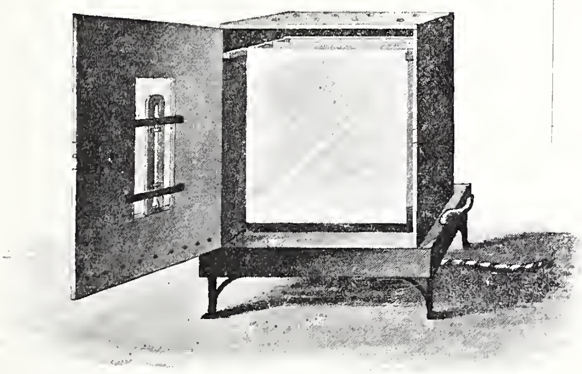


Fig. I.
Drying Cupboard for Photo. Lithographic Transfer Paper.

The paper thus dried must be kept in the dark, and for convenience it may be rolled and placed in a wide stone jar with an airtight lid, only sufficient being taken out for immediate use. After sensitizing, however carefully this paper is preserved, the composition gradually hardens, and ultimately loses its power; this is especially the case with paper sensitized by potassium bichromate. Before use the paper must be flattened and calendered, of course avoiding exposure to white light during the operation.

Retracing the ground somewhat, it is advisable to consider other methods of preparing photo-litho. transfer paper. In the early stage of this chapter allusion was made to Professor Husnik's prepared paper, which, according to authority, is patented in Germany. The prepared paper is very similar to that which is fully described in the early part of the chapter, and the composition consists of :—

Gelatine	1-oz.
Water...	24-ozs.
Chrome Alum	1-dram.

The preparation and treatment of this solution is exactly as previously described; whilst the omission of the sugar does not tend to improve the paper as compared with the former recipe.

After this gelatine solution is coated on the paper, it is sensitized upon a solution of :—

White of	1 egg.
Water	2-ozs.

The paper having been floated upon this, and dried, is then finished by floating it upon a bath of :—

Bichromate of Potassium	1-oz.
Methylated Spirits	4-ozs.
Water	14-ozs.
Liquor Ammonia	q.s.

The ammonia being added until the reddish solution is turned a bright yellow. It is almost needless to repeat that this paper is dried in the drying closet, and ultimately treated in the same way as the papers previously described.

Upon this point of sensitizing Professor Husnik's paper, it should not be omitted that English manipulators are accustomed to treat the paper as received with its gelatine coating, simply with a solution similar to the second sensitizer just mentioned, with only a slight difference in quantity. The sensitizer being :—

Bichromate of Potassium	1-oz.
Methylated Spirits	5-ozs.
Water	16-ozs.
Liquor Ammonia	q.s.

The ammonia being added until the solution turns to a bright yellow. Too much ammonia will cause mischief later on.

In sensitizing Professor Husnik's paper, care should be taken to put the paper face upwards in the dish, to prevent disturbing the gelatine facing upon it.

Before disposing with transfer paper compositions, it is interesting to note the preparation of it as carried on at the Military Geographical Institute of Vienna. The paper—well sized—is soaked in water until limp and allowed to drain. It is then pressed with the squeegee on to a plate of glass, and the superfluous moisture removed by blotting paper. When almost dried, the edges are turned up to a depth of 2-cm., and warm gelatine solution (one of gelatine to thirty of water) is poured upon this paper tray. It sets readily, and is removed to dry upon wire gauze, the final drying taking about forty hours. The sensitizing is performed a day or so before use, by immersing for three or four minutes in a cold bath of :—

Bichromate of Potassium ...	1-oz.
Water	15-ozs.

After removal and draining, the coated side of the paper is put upon a glass plate, which has been thinly coated with wax or a solution of ox-gall, or it may be placed on a ferrotype plate, the latter presenting a surface upon which it is almost impossible for the gelatine to adhere. The back of the paper is blotted dry and air-bubbles carefully pressed out. The paper is now in such a condition that all these operations must be carried on in the dark room. The paper having dried upon the plate, it is cut up to the sizes required. In the concluding operations, this paper is treated very similarly to those already dealt with. It will be noticed that chrome alum is not added to the gelatine, an omission which subsequently has often to be made up, for in the soaking operation the

gelatine is liable to swell too much, and has to be soaked in a solution of 1-oz. of chrome alum in 200-ozs. of water to harden it again. It is difficult to see what advantage the Viennese find in leaving out the chrome alum in the first coating, when it has so often to be put in at a later stage.

Having thus far given instructions for the preparation of the transfer paper, it is now necessary to describe the mode of using it.

The paper, whichever make is in hand, taken from the stock in the stone jar, is rolled flat and calendered, cut to size, and placed upon the negative in the printing frame. The printing frame is similar in construction to the photographer's frame, except that it is much stronger. It should be more like a box, with a thick plate glass front, upon which the negative is placed—after most scrupulously cleaning the plate glass and the back of the negative. It is at this point where the smallest grain of dust will make itself apparent, most probably by cracking the negative. Upon the film side of the negative is placed a piece of the transfer paper; this is packed in with blotting paper or felt, and the two-fold back is put upon the backing and carefully screwed down. It is far more judicious to have the two-fold back screwed than to rely upon the springs with which the ordinary printing frame is fitted. The screw adjustments will give absolute contact, and a frame so made will be suitable for the "printing" in the zinc block process and collotype. The frame having been thoroughly cleaned, it should be exposed to direct sunlight. The time for such exposure is so uncertain, that mechanical aids alone can be relied upon. It is the sad experience of many, that in removing a frame from the heat of sunlight to the cool dark room, the negative has been cracked by the change of temperature. It is also found that in examining the progress of printing, which should be done in a dark room, the heat inside the frame is so readily counteracted by the cold air when half the back of the frame is opened, that the paper contracts, and in readjusting the paper in the frame for final exposure, the paper has moved from its original position, causing thickened lines in the finished transfer. The only way to obviate these accidents is to use a dummy printing frame. It only needs to be a small one, constructed on the same principle as the larger one; screw adjustments are not absolutely necessary. In this small frame put a negative similar in character to that in the large frame, and conduct the operation as though the small one were the printing frame from which the finished transfer should be produced. This frame can be examined with less care, in half light, without so much risk, and can be used therefore to time the exposure of the larger frame. Another way of timing the exposure is by using Johnson's Actinometer. This little instrument is fitted with a strip of sensitized paper, a very small portion of which is exposed through the transparent centre of a glass slip, the remainder of the glass being coloured to the equivalent of what is termed "one tint." By exposing a piece of the paper it becomes tinted, and when the tint has deepened to the shade of the surrounding tint on the glass, it is counted as one tint, and a fresh piece of paper is drawn along for exposure. In course of time, the operator determines for himself how many "tints" are necessary to produce a good transfer, and having settled that point, the Actinometer can be relied upon in any light to register the proper equivalent. The drawback to its use is the necessity for constant watching, to expose fresh paper in direct sunlight, and in this one point alone the dummy, or second printing frame, has the advantage. If the latter be used, or if the original print be examined, the transfer has been sufficiently exposed when the image can be seen in all its details in a nice light brown upon the yellow paper. The special advantage of examining the print itself is that proper allowances are made for bad negatives, whilst the Actinometer and second frame ignore this possibility.

The print is now removed from the frame, and after a slight rinse in cold water, is placed face upwards upon a flat surface. This surface may be a sheet of zinc or glass, either of which will allow the edge of the print to be folded under the plate, and thereby held firmly during the next operation of inking. There is, however, a more convenient inking table for this purpose, as shewn in the illustration (Fig. 2). It is easily made by any amateur. The size will entirely depend upon the size of the work it is intended to undertake, but a convenient table may be 20 inches long by 15 inches broad, and will be large enough for the products of most cameras. The table is hinged underneath to allow the board to be opened right across. This joint should be a rebate, so that the edge of the paper when gripped will be held firmly, and the more so during the pressure of the roller on the transfer. The table is made to incline by the block at the end, so that a certain amount of spring is given, to get a good grip of the paper. The table should be well varnished with clear varnish several times, which will allow of it being cleaned with turpentine.

Fig. II.
Inking Table for Photo-Lithographic Transfers.

The transfer having been fixed—whether previously damped or not, some prefer the latter—upon the inking table, the inking operation is performed by rolling down the board from the gripped edge, with a letter-press roller, charged with a finely ground transfer ink. The roller must not have a ridge upon its surface as is the case with those rollers cast in moulds made in sections. The photo-transfer ink is too thick for immediate use, and must be thinned with turpentine. The inking will decide as to the ultimate value of the transfer. If the ink be too thick it will be of no use, and if the ink adheres equally to the whole surface without bringing out the image, it is also useless. The proper condition for a good transfer is to have an even, thin film of ink all over, and the image plainly visible throughout, not black, but quite distinct in detail, and this condition is arrived at by rolling in one direction with the ink nicely thinned, until the roller begins to adhere to the paper. The rolling is

then discontinued, and after allowing a few minutes for the evaporation of the turpentine, the whole transfer is soaked in cold water for nearly half an hour. During this time the cold water soaks into the composition, and loosens all of it that has not been exposed to light under the negative. Those parts which have been exposed become hardened and insoluble in warm or cold water. From the dish, the transfer is placed upon a smooth surface, or the water is drained from the dish and the transfer is left on the bottom of it. With a clean tuft of lint, the surface is gently rubbed, and the unexposed portions are thereby cleared away, leaving the picture distinct. If this first cleansing be not sufficient, the transfer is returned to a dish of fresh clean water and again allowed to soak. Whilst soaking, it may be assisted by gently rubbing the surface with lint, where it can be seen the bichromate is still left. The latter must be entirely removed to prevent hardening and cracking later on.

With due care and a good negative, the foregoing manipulation should give satisfactory results. If, however, the ink refuses to leave the transfer, the fault may lie in several directions. It is quite impossible to say which may have been the cause, and it is only by carefully watching each operation that the error can be detected. The substances used are not always of the same purity, and to some extent this may be the cause, but in the majority of instances it arises from operations directly under the control of the manipulator. The drying cupboard must be proof against the fumes from the gas stove, or other sources of foul air, and must be kept up to 80° F. during the drying. The sensitizing must be conducted in the dark room, and the paper not allowed to remain in the bath too long. Whilst too much ammonia or too little methylated spirit may militate against good work. The accidental exposure of the transfer paper to white light will greatly destroy the sensibility of the paper.

The photo-transfer, after a final rinsing, is dried between sheets of blotting paper. It is a great mistake to transfer the print to stone immediately after rinsing or when part dry. It must be thoroughly dried, and in transferring treated exactly as a warm stone transfer. After transferring it must be left some time before any attempt is made to roll or rub it up.

However carefully paper is used, the stretching cannot be avoided, and with such work as maps, plans, or mechanical drawings, upon which is written the scale to which it is drawn, it is of the greatest importance to retain the exact dimensions. This can only be done effectually by photographing and printing upon sensitized zinc instead of paper. The manipulation of zinc being a distinct process, in which the negative requires to be reversed, it will be dealt with in a subsequent chapter.

As some of our readers may prefer to prepare their own photo-transfer ink, two recipes are here appended. The first is a well-tried English ink, and consists of:—

Best Chalk Printing Ink	4-ozs.
Beeswax	½-oz.
Stearine	½-oz.
Resin	½-oz.

It is compounded by melting the resin, adding the wax, then the stearine, and finally adding the ink little by little. The whole is well stirred, and melted. It can be stored in printing ink tins.

The second is a German recipe, and shows a wide difference from the first one. Its ingredients are:—

Chalk Printing Ink	4-ozs.
Beeswax	10-ozs.
Resin	7-ozs.
Turpentine	40-ozs.
Tallow	8-ozs.
Prussian Blue	6-ozs.

Owing to the excess of turpentine this ink has to be compounded in a position well guarded from fire. The resin is melted, and the wax added; the tallow is next added, whilst the turpentine is previously used to dissolve the ink and the blue in. These latter must be added when the previous mixture has cooled down somewhat. When they have been added, the whole is again warmed and thoroughly mixed. This ink is liable to harden with keeping, and in use must be moistened with a few drops of olive oil.

In bringing this chapter to a conclusion, there is yet one other useful photo-transfer paper, which may suit some manipulators better than those already described. The paper is coated with a mixture of:

Bermuda Arrowroot	4-ozs.
Bichromate of Potash	1½-ozs.
Water	60-ozs.

The arrowroot is mixed into a paste with cold water; the bichromate is dissolved in the water, and the latter is added boiling to the arrowroot paste. The paper is coated warm and dried.

In using this paper, the only difference from the previous methods is in soaking out the bichromate in water at 100° F., instead of in cold water.

Apparatus Required.

	s.	d.	
Good negatives			
Gas or paraffin stove	2	6	each.
Two earthenware or porcelain dishes—vulcanite, small	0	7	,,
,, ,, ,, ,, large	4	0	,,
,, ,, ,, porcelain, small	0	7½	,,
,, ,, ,, ,, large	3	6	,,
,, ,, ,, papier maché, small	0	7	,,
,, ,, ,, ,, large	2	6	,,
Two zinc trays—20in. × 15in. × 4in.	7	6	,,
Two wide-necked, quart, glass bottles	1	6	,,
Glass funnel—3in. diameter	0	4	,,
Lint and cotton wool	1	0	
Blotting paper..	2	0	per qr.
Drying closet—by Winstone	21	0	each.
,, —as illustration, complete. (Fig. 1.) ..	40	0	,,
Inking board—by Winstone. (Fig. 2.)	6	6	,,
Strong, well-made printing frame .. from 15s. down to	4	0	,,
Palette knife	1	2	,,
Ink slab of lithographic stone—16in. × 12in. × 1¾in. ..	0	1¼	per lb.
,, Thin zinc, gauge 15	2	2	sq. ft.
Specially prepared water-resisting composition roller on letterpress or litho. stock—6in. long, 9/6; 8in. long, 11/6 .. .. 10in.	13	6	each.
Glass plate, 20in. × 15in. × ⅜in. .. .. .. about	2	6	,,
Johnson's Actinometer—Autotype Co.	2	6	,,
Stone jar, 15in. high, 6in. dmtr., with tight-fitting lid	2	6	,,
Yellow blind .. .. 36in. wide	1	4	per yd.
A dark room may sometimes be purchased cheaply second-hand.			
Sponges (fine Turkey)	0	6	each.
Saxe's unprepared paper for transfers	3	0	per qr.

Apparatus Required—*continued.*

	s.	d.	
Rives' unprepared paper	3	6	per qr.
Bank post paper	1	0	,,
Husnick's prepared paper for line work	12	0	,,
Winstone's prepared paper for half-tone litho. transfers	16	0	,,
Plain gelatinised paper	8	0	,,

N.B.—Winstone, of London, supplies Professor Husnick's paper, and all the other apparatus mentioned in the foregoing list.

Chemicals Required.

		s.	d.	
Nelson's amber gelatine		4	6	per lb.
Egg albumen		6	0	,,
Bichromate of potassium (Woolley, Manchester)	pure	1	2	,,
Bichromate of ammonia ,, ,,	,,	0	3	per oz.
Bichromate of sodium ,, ,,	,,	0	6	per lb.
Chrome alum (20 gr. solution) ,, ,,	,,	1	0	,,
Ammonia solution (sp. gr. ·880) ,, ,,	,,	0	6	,,
Methylated spirit (methyl. alcohol) ,,	purified	3	0	,,
Sugar		0	4	,,
Turpentine (according to market price)	purified	1	0	per pt.
Photo-transfer ink		10	0	per lb.
Tallow		1	2	,,
Stearine (Winstone, London)		1	2	,,
Beeswax		3	0	,,
Chalk (printing) ink (Winstone, London)		8	0	,,
Resin		0	4	,,
Prussian blue	best	3	6	,,
Arrowroot		1	6	,,
Glycerine	10d. to	1	6	,,
Palm oil		1	4	,,
Gum		1	0	,,
Tannin		4	6	,,

N.B.—Winstone, of London, supplies photo-transfer ink ready for use.

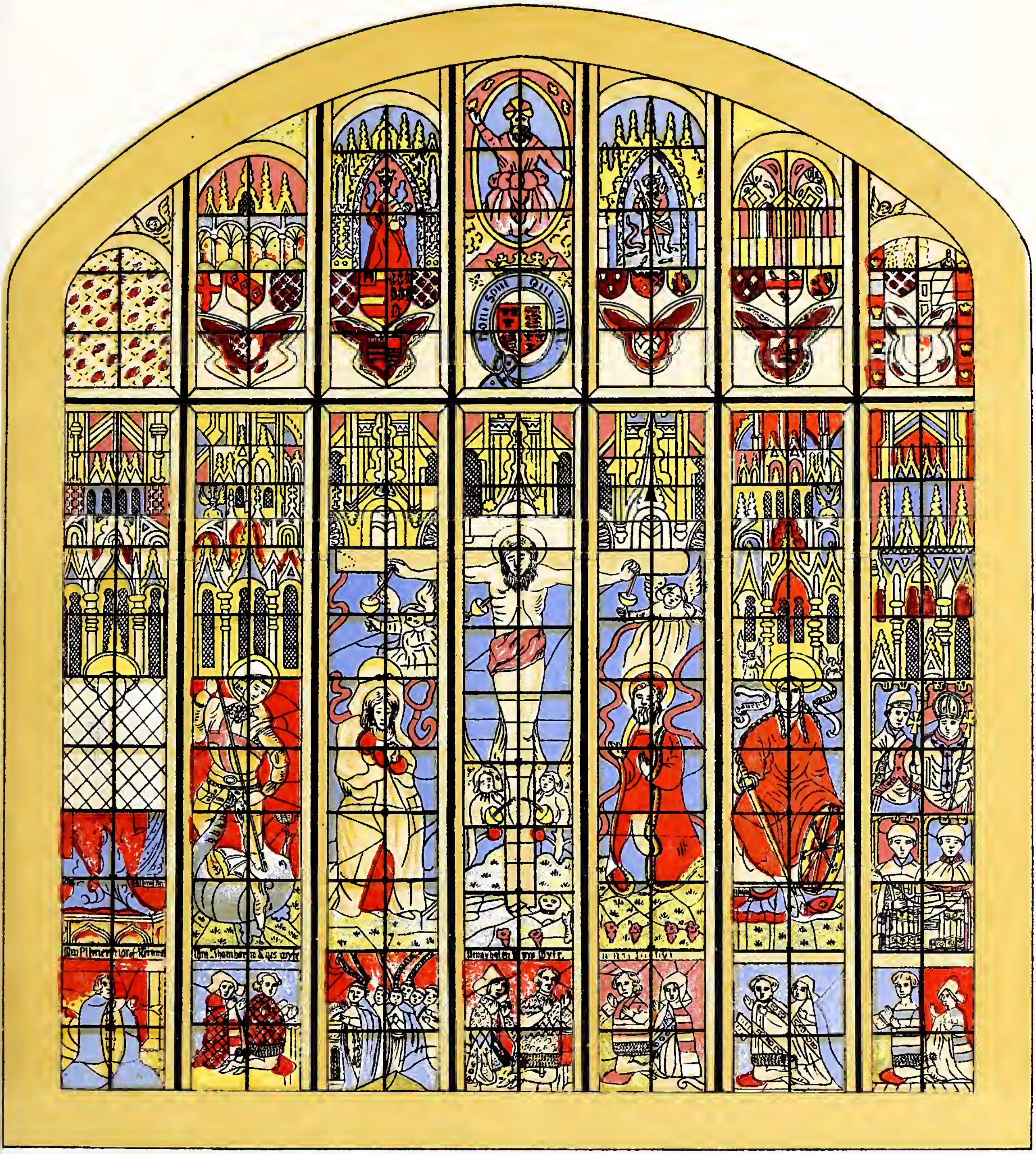
Exhibition of the Photographic Society of Great Britain.

This year's exhibition of photographs and photographic apparatus at the rooms of the above society in Pall Mall East, opened during September last, has proved in every way satisfactory, and has been largely patronised by lovers of the fascinating art. It is not without special attractions for our readers, for the mechanical process exhibits, though few in number, are excellent in kind. Of course the executive of the society were catering for the lovers of photography pure and simple, and scarcely attempted to illustrate its application to the industrial arts. Photography considered in relation to letterpress and lithographic printing is admittedly in its infancy, but it has already effected a revolution in book and periodical illustration, and opened up a field of possibilities in the future, the full significance of which it is difficult to estimate. That it will play a great part in the printing world at no distant date there is absolutely no doubt, and every year its importance as a factor in the applied arts is more remarkable.

The Exhibition contains 708 exhibits,—646 photographs, lantern slides, etc., and 62 photographic apparatus', which latter include a very ingenious glass cutting machine for cutting photographic dry plates, to work by hand or power. It is exhibited by the Paget Prize Plate Company, and has been awarded one of the Society's medals. Of the photographs we need say nothing here, beyond remarking that on the walls are many excellent examples of the art, representing every imaginable subject, and produced by every method now employed. It might have been an advantage from an instructive point of view if the pictorial exhibits could have been arranged in a different manner, though this could only have been done at the expense of the general effect. Instead of being promiscuously hung, it might have been an advantage for the sake of comparison, if the exhibits had been classified, and grouped, so as to clearly represent the several photographic processes. Unless a considerably larger collection were at disposal, such an arrangement would perhaps be difficult, even if desirable, and from the aspect of artistic variety would probably spoil the *tout ensemble* of the walls.

The various mechanical processes represented include autogravure, collotype, ordinary photo-etchings for the survey department of India, and specimens of work by the Woodbury Company, the Autotype Company, the Sun Artists' Association, etc., and the various styles are illustrated by some thirty or forty exhibits. Of the eight medals awarded to exhibitors, one was secured by the Autotype Company for an autogravure,—being a copy from the painting (Outward Bound) by F. Brangwyn in the Royal Academy, 1890; and also one by F. C. Colls for six copper-plate photo-etchings (from negatives from nature), by permission of the Sun Artists' Association. The successful picture sent for competition by the Autotype Company was a fine example of photo-engraving; the reproduction from the original is simply perfect. We see the touches of the brush and the very grain of the canvas, in fact it is a wonderful copy of the original, while the chiaroscuro of the picture is undisturbed, and the result is distinctly unmechanical in appearance. No. 521, sent by the same firm, is a capital specimen, and in the beauty and clearness of the work is almost equal to a steel engraving, and might easily be mistaken for such by any but a competent critic. Other specimens of this enterprising Company, in various styles, only serve to accentuate the fact that this method of engraving is capable of almost anything, and that by the aid of photography these processes have been brought to a state of perfection which is simply marvellous. The examples of photo-etching by the Survey Department of India are scarcely to be excelled. There are some admirable samples also of the thio-carbamide direct method and ordinary method of photo-etching from drawings. The examples of collotype printing are not numerous, but they are exceedingly good, and the particular softness and delicacy of treatment is very attractive. The Woodbury Permanent Photographic Printing Company, of which Messrs. Eyre and Spottiswoode are proprietors, exhibit some excellent work, including collotype, carbon printing, and enlargements, and the new adoption of the Woodbury process—Woodburytype-gravure.

There would be no advantage in examining all the specimens of photo-engravings in this exhibition, even were space at our disposal, for they are all first-class, and while none of them seem to have any serious defect, they share the recommendation of having each some admirable distinguishing feature.



Printed by J. Richardson, Barrow in Furness.

THE FAMOUS FURNESS ABBEY WINDOW, NOW IN THE PARISH CHURCH BOWNESS, WINDERMERE.

Respectfully dedicated to Major General Bellasis.

Printed with Mander's Lithographic Inks.

New Books.

FROM Herr Josef Heim, Vienna, we are in receipt of two series of "Cartouchen," by Ferd. Wüst and H. Gerard Ströhl respectively. They consist of admirably drawn designs, suitable for cards, headings, covers, title pages, and other similar purposes, printed in black on stout plate paper, and enclosed loose in portfolios, so that they may be taken out and used as studies. Each portfolio contains 24 plates, including upwards of 40 different designs, and sells at 10/-. To the artist and designer they are full of useful suggestions. All Herr Heim's publications may be had from the B. L. office.

A NEW edition—the fourth—has just been issued by Messrs. Hampton, Judd & Co., Duke-street, W.C., of W. T. Wilkinson's useful manual on "Photo-Engraving, Photo-Lithography, and Collotype." The instructions are complete and reliable, and the two collotype illustrations are gems of art work. We are very much surprised to see that it does not figure amongst the text-books recommended by the Science and Art Department for lithographic technical classes.

ANOTHER very valuable edition to the literature of printing has been made by an entirely new publication upon "Photogravure," by W. T. Wilkinson, with a splendid illustration by Walter L. Colls. Messrs. Iliffe & Son, 3 St. Bride-street, London, E.C., have given to the public a concise, cheap, and useful little book.

AMONGST the works for artists announced on another page by Herr Josef Heim, of Vienna, "The Album Lithographique" and "Etiquetten Schatz" are full of suggestions useful to lithographic artists. The Album consists of specimens of commercial work, in colour and monochrome, by artists and printers of Germany, France, and the United States, and is useful not only for the ideas contained therein, but as showing the variety of styles of work cultivated in each country. A specimen page from the "Album Lithographique" is given in this issue in the shape of two designs for menu cards. The "Etiquetten Schatz" is a collection of coloured designs for labels, many of which also offer suggestions for show cards and other purposes. Every artist will find something worth "lifting" in each part.

THE November number of *The Art Decorator* (London: The Electrotype Co., 80, Fleet-street) opens with an effective plate of wood and ivory inlay work in the natural colours, by E. Schaudt. The plates of "Caryatides," by R. Knorr, and "Amourettes," after Tettelein, both in monochrome tints, are excellent. "Borders and Fillings," by Moureau, are full of suggestions in design and colour; and the plate of "Birds and Flowers," by C. Votteler, is both original in design and charming in treatment. We are pleased to learn that the demand for this useful and instructive monthly is increasing amongst the artistic public. A better shillingsworth could scarcely be desired.

IN the November part of *The Magazine of Art* a new departure is made by including a coloured frontispiece—produced by chromo-phototypie. We cannot say that we are enamoured with the result. In the first place, it is claimed to be a copy of an oil painting, but even after allowing for the treatment of the picture in its fine atmospheric style, it is very difficult on looking at the copy to believe it is from an "oil." It is claimed that the method of production shews even the brush marks; but in this we fail to see the advantage, for whilst the brush marks of the original by their prominence produce secondary lights and shades, often very effective, yet in this case it simply adds an unnecessary streakiness to the picture without the corresponding result. Certainly, the method of printing this plate should claim our attention, for it is a very close imitation of chromo-lithography, and may have a considerable influence in the future in diminishing the demand for lithographs.

THE November number of *The Art Journal*, if lacking in general interest, makes up for any deficiency in other directions by the publication of the original etching, by Wilfred Ball, of "Venice from the Lagoon." Intending competitors for National Honours in design will feel interested in the article upon the recent competition; and as it is quite impossible for most people to see all the medal designs, *The Art Journal* would do a good service by illustrating even more of such drawings.

JUST as we close for press comes the second number of the new American *Lithographers' Journal*, its bulk —twice the quantity of No. 1—proving that it has "caught on" from the start. It is published by the proprietors of *Paper and Press*, and like that handsome journal, is a model of completeness, literary, artistic, and technical. In fact, in every department it bears evidence of being in the hands of men who know their business and can show cause for the faith that is in them. Our scissors are thirsting for its columns, but we forbear till next issue.

WE note that the *Artist Printer*, now the property of and edited by Mr. A. C. Cameron, late of the *Inland Printer*, has commenced a lithographic department, in charge of Mr. Fred. Bühring, late of the *American Lithographer*.

TO STEREOTYPE ZINC ETCHINGS.—For this work a very wet mould, free from creases, is recommended. Those who use ready-made flong should let it lie twenty minutes in cold water, carefully dry between blotting paper, and then beat in. Those who prepare their own matrices will mix the matrix-powder or chalk with cold water to the consistency of milk, and spread thickly on the paper, beating continually but lightly with a soft brush. All zinc etchings must be thoroughly washed with paraffin before stereotyping, and also woodcuts which are to be stereotyped. Old woodcuts and etchings which are covered with hard-dried ink must be laid down in paraffin for at least half-an-hour, otherwise the stereotype will not be a success.—*Der Stereotypeur.*

The Annuals.

Amongst the many presentation plates given at this season of the year with almost every publication, from the daily newspaper to the high-class periodical, it is difficult to say which is the best, for whilst some are simple in their composition, others are full of thought—yet all of them display the skill of the lithographic artist and printer to the highest degree.

In their efforts to compete with one another, none seem to have aimed at the production of a really high-class work of art with greater success than the *Illustrated London News*. The copy of the "Rival Belles," from the original of Eugene de Blaas, although so large, is well worth preservation, if only as a remarkably handsome example of lithography. The subject may not be of a popular nature, but there are other papers which err in this respect and yet obtain a large measure of support from those who view them in other than the popular light. Belonging to the same category is the plate of "Ophelia," from the original by Marcus Stone, R.A., presented with the *Graphic*. This paper also gives a second plate in chromolithography, of a painting of kittens by the talented artist Madame Rouver, entitled, "A Disagreement on a Point of Art." This plate is certainly of a popular kind, and does not fail to attract the attention of young and old. After the same style may be mentioned the plate with *Father Christmas* of the amusing picture by Fred. Morgan, "Now for the Baby, Dogs," and the plate of "An Unwilling Partner" by Arthur G. Elsley, given with the *Penny Illustrated Paper,* partakes of the same feeling. *Weldon's Children's Bazaar of Fashions* furnishes another good plate of a similar character in "Anticipation," by A. Burr, whilst *Weldon's Illustrated Dressmaker* also gives a pretty plate entitled "Dolly's Portrait," by Edith Scannell. *Weldon's Ladies' Journal* is accompanied by two plates—a large one of plucking the Christmas goose, entitled, "Hearts Light as Feathers," by Joseph Clark, which is certainly very pleasing and attractive, and the smaller one of "Familiarity Breeds Contempt," by H. G. Glindoni, is not at all a bad subject. Intermediate between these amusing pictures of the childish type, stands *Pears' Annual* with its three large plates. Our attention has been especially attracted by the oblong plate of the jovial monks gloating over some joke in *Punch*, from the original by Pietro Torrini, "A Good Joke." The other two plates are of the ordinary type of chromolithography, the "Garden of Eden," by Fred. Morgan, being considerably more attractive than the decorative panel of "Oriental Colours" by W. S. Coleman.

At this season of the year the *Yule Tide* plate recalls the terrible experiences of our British Heroes of the Crimean campaign by depicting "Florence Nightingale in Hospital at Scutari in 1854." It is a good production, but scarcely acceptable at a time of general festivity.

The *Queen* publishes two fine plates, one from a picture by Davidson Knowles entitled "Sunny Days," and the other, "Love's Secret," from a water-colour by Miss Valentine Gravier.

Pen and Pencil is replete with chromo work. Besides the large plate, there are four other coloured plates. The large plate, "Awake," is certainly a good drawing of the subject in hand. The *Young Ladies' Journal* also gives a large plate by H. French, entitled "A Piece of Misletoe, Sir?" Though it does possess some merit, yet the wax-like features and the pose of the children have too much the character of fashion plates to make the picture one of those with which anyone is really pleased.

The *Gentlewoman* has conceived an idea with which we are not generally familiar, except in small tasty work. The presentation plate by E. G. Thomson, of "Her Eyes are Homes of Silent Prayer," is printed on a panel of satin, 17 inches by 10 inches.

Perhaps one of the most catching presentation plates of the season is the "Rival Queens" from the painting by V. Corcos. It is exceedingly pretty in treatment, and forms a first-rate companion picture to the plates published in 1889 and 1890, also by the *Lady's Pictorial.*

Taken altogether, it does not seem that the standard of past years has been maintained, excepting the 1890 series. It may be, that there being so many to select from makes people a little fastidious, or that the ever increasing quantity has made them too common and consequently less thought of.

Trade Notes.

Specimen books of the Lithographic and Collotype Inks and Dry Colours, manufactured by Messrs. Kast & Ehinger, have been sent us by their agent, Mr. Frederic Wesselhoeft, whose address will be found in his business announcement on second page of cover. The litho. inks are already well known to British printers, and quite a number of the colours are marked as having been in use for many years past by some of the leading chromo-calendar publishers—a recommendation of itself enough to establish their reputation. The collotype specimens show a fine array of photo. and "art" tints, and are specially noted for their softness and delicacy of tone.

We have recently heard a good many commendations, some of them in unexpected quarters, of the "Express" Gas Engine, manufactured by Messrs. Furnival & Co. It possesses many points of excellence, has all the latest improvements, and is a thoroughly economic motor. A new central combination has proved of great utility in reducing consumption of gas. Every part of the engine is made as simple as possible, so as to offer no obstacles to being easily understood and easily kept in order, and in finish of workmanship it compares well with any in the market.

Printers or publishers requiring new and artistic designs for illustration should see what Messrs. Schilling & Co. have to offer. They employ the best talent in every department, and undertake also the getting out of plates for colour work. A visit to 7 Ludgate-square, Ludgate-hill, E.C., will repay the time spent. S. & Co. are full to overflowing of attractive and useful ideas.

Notes and Queries.

[*Through this channel anyone submitting a question upon printing or allied processes can receive an answer, either from our staff of practical technical writers secured for this Journal, or from some reader who may be better qualified to answer "special" questions.*]

THE following questions have been received from Mr. C. Shalcross, 71 Myddleton-street, Clerkenwell, London.

(1). "Will you point out the differences between the photo. processes allied to lithography—viz., photo-litho., ink-photo, photo-tint, photo-mezzotint, photogravure, collotype, Woodburytype, &c.?"

ANSWER: In the space allotted for these matters it is impossible to enter into the subject matter of the question with the degree of fulness which is desirable and probably expected by our interrogator. In the course of the papers on photo-mechanical processes, each one of the methods named will receive a full and ample description, and we must ask our readers to be satisfied with a certain amount of brevity here, especially when a question covers such a large area.

Photo-lithography in line and half-tone consists in preparing negatives from copies or from nature, and printing the positive upon a sensitised transfer paper. This transfer is inked up in printer's transfer ink and is transferred to stone, thereby becoming an ordinary lithograph.

Ink-photo is a process of half-tone photo-lithography, so named by Sprague.

Photo-tint is a process of half-tone photo-lithography, so named by Ackermann.

Photo-mezzotint is a term with which we are not familiar, and are of opinion that it has been confused with *Photo-mezzotype*, which is the name given by the Stereoscopic Company to their process of Collotype.

Collotype is the method of printing any negative photograph upon a sensitised film of gelatine. The positive picture thus obtained can be printed from much in the same manner as from a lithographic stone.

Photogravure, in its restricted and special sense, is the process of etching a picture into a copper-plate from a photograph, which has been "printed" (in the photographic nomenclature) upon the plate, sensitized and prepared in the proper way.

Woodburytype can scarcely be classed as an ally of lithography, since the negative is prepared upon a film, which will swell on moistening. Advantage is taken of this property in producing a leaden mould, by forcing the negative into the lead by hydraulic pressure. The prints from this type or block are pulled with a gelatinous ink, and so closely resemble photographs as to be mistaken for them.

Photo-Collotype, Albertype, and *Heliotype* are names given to Collotype or modifications of Collotype.

Leimtypy is a process of printing in letterpress from blocks, prepared with a collotype film, and treated very similarly.

(2). "Which is the best way of starting to learn any or all of the above, at home? What materials are required? What is their probable cost? And what technical books are published on the subject, giving the prices of the same?"

ANSWER: Much will depend upon home accommodation; and, in the first place, the operator must be able to claim exclusively the use of a room, which at will can be darkened by the use of yellow, orange, or ruby screens before the windows, so that white light is utterly shut off. Many little things can be done without, but their use greatly facilitates the methods of production. There should be means of drying in a closed box, fitted with a thermometer, and heated by gas (see answer to Question 1. Honours Grade Examination, p. 17, No. 1 BRITISH LITHOGRAPHER). There should be a sink with tap above it for a plentiful supply of clean water. It might be noted that clean water and plenty of it are most necessary for clean, successful work. For soaking purposes there will be required large, shallow, oblong dishes of vulcanite, china, and wood (lined with pitch to make them water-tight), each for its own purpose.

For preparing paper, etc., flat brushes are necessary. For rolling up, a letterpress roller is almost exclusively used, and for the rolling operation a board should be made which will clip one end of the paper firmly. A sheet of zinc as an ink slab, a palette knife, sponge, cotton wool, turpentine, transfer ink, resin, bitumen, glycerine, sugar, caustic soda and potash, blotting paper, gum, bichromate of potash, eggs, albumen, gelatine, ammonia, methylated spirit, and bichromate of ammonia are among the ordinary materials in use for photo-lithography. Next to photo-lithography the most possible method to work in conjunction is Collotype. But this can only be done in a press properly constructed for the purpose. The materials given above are mostly used in this process, with additional appliances fitted in the drying box for levelling the Collotype film when drying. Collotype films are supported on thick plateglass of a very superior quality (Best British plate, at least ⅜ inch thick). Other materials used are emery powder, a squeegee, silicate of soda, stale beer, tinfoil, a lithographic fine nap roller, muller, another ink slab, oxgall, cyanide of potassium, and a specially made photographic printing frame.

Besides the foregoing appliances it will be necessary to add more if zinc block etching is to be accomplished. In this process well made zinc plates are required, the polishing of which is completed with fine emery cloth stretched on a block, or carpenter's cork. Then the whirler is a very necessary instrument for evenly coating the plates. Pumice powder, nitric acid, a spirit lamp, special photo-transfer ink, and an extra strong photographic printing frame will complete the equipment.

The intending operator has two courses open, either to get a friendly photographer to prepare all his negatives or make them himself. To do the latter there will be an additional expense of at least £5. The camera, at least half-plate size, with a rectilinear or symmetrical lens, and all the chemicals can be selected upon the advice of the dealer, or after a study of "Burton's Modern Photography," to be obtained of any photographer, price 1s.

Over and above the photographic outfit it will be necessary, if the art is to be followed thoroughly, to

have a rigidly constructed copying table and slides, and to have an enlarging camera.

On the question of books, it is our opinion that one good authority carefully followed is superior to a quantity of books only half studied ; and at the outset we recommend the latest edition of "Photo-Engraving, Photo-Litho. and Collotype," by W. T. Wilkinson, published at 5/- by Hampton, Judd & Co., London.

(3). "Which of the processes would you recommend to commence with and the others to follow in rotation?"

ANSWER : The order of procedure should be to make oneself perfect in photo-lithography, including the making of the transfer paper. Then follow on with Collotype ; passing to zinc block work in line, and later, in half-tone, following that with photo-lithography in half-tone, and, finally, photo-gravure.

THE following question has been asked by Mr. W. H. Armitage, of Manchester :—

"I purchased roller skins direct from a French agency, and on receiving them was well pleased to find the nap so fine and velvety. I broke them in with castor oil; and all went well for a time. Another set of skins similar to my own was also purchased; both sets have since become very whimsical, for whilst *they* will roll up heavy work, yet the other set refuses to roll up fine work or medium work at all, probably because it is caked with ink ; but my own set, which is clean to the skin, also refuses to roll up medium work, and will occasionally roll fine work all right. Can you explain the cause or the remedy?"

ANSWER : The nature of the roller must in some way be unsuited for the purpose, and a few analogies may show how this probably lies at the bottom of the mischief. A draughtsman would not use a B pencil to draw a fine line, it is too soft, and would require too much dexterity, he would choose an F or an H pencil, and would at once get the desired effect. In painting, an artist might put his washes on with a camel hair brush, but he would scarcely attempt to use camel hair for touching or stippling, no more than a lithographic artist would use camel hair for drawing upon stone ; the camel hair is too soft, and its want of firmness would render it quite unsuitable for a heavy pigment. This may be exactly the fault of the skin in question, the nap is too fine and too velvety. It may be said that the nap cannot be too fine, but such a statement will not bear reflection; for why do printers use *three grades* of nap rollers for different work? Each nap has its special office, and a nap roller to be of any use must retain a firmness in its nap sufficient to withstand being smoothed down by a strong, heavy ink. If the nap does fall, then the roller becomes a flat roller and not a nap. In the early days of Collotype the idea of using a soft roller became so predominant that velvet rollers were made. Experience has shown that the pile is not powerful enough to cope with the ink used, and after a few days' use becomes matted and entirely incapable of putting the ink upon the work. It may be exactly the same in the case in question, the pile is too soft and becomes matted on the surface. If that be so, then the rollers are only useful for such purposes as the glazed and grained rollers are constructed for.

It may be possible to regain some of the qualities of the nap roller, by allowing strong varnish to dry upon the skin and harden the nap; and in ultimate use, not to entirely cleanse the varnish out of the nap.

Answers to Correspondents.

ONE of the students—Mr. W. R. Streeter—who obtained a First Class Ordinary at the late examination, points out that in his experience of chalk printing, the answer to question four of the ordinary grade on page 15 of No. 1 BRITISH LITHOGRAPHER is not in keeping with his practice. It is stated in the answer that *to wash it out with turpentine would mean permanently impoverishing the work*, with which Mr. Streeter agrees in the main, but adds that he washes out *every job* either with turps or turps and oil, and he finds they roll up and print quite equal to the other method mentioned. We would ask our readers to refer to the question, in which it will be distinctly seen that it is a "*delicate* chalk drawing" which is being proved. Practical experience is difficult to refute, but whilst Mr. Streeter has had success in his method of treatment, many others have had failure, and in putting in the phrase to which he makes objection, we were speaking on the safe side for the sake of those who were without experience, or whose experience had not been upon delicate work. Having seen much fine work destroyed in its early stages by too rough handling, we wished to impress carefulness at the beginning to secure a firm hold for the work. Subsequently, we shall give the experience of other printers in the same process, and it is at least striking to see what novel methods can, by practice, be brought to a state of perfection in one man's hands and to failure in another's.

MR. CLARKE, of Derby, draws our attention to an instruction given on page 10 of THE BRITISH LITHOGRAPHER No. 1, in the article on lithographic rollers, wherein it is stated that *it is advisable to scrape rollers every night when leaving work.* He points out that the oil and varnish used in the ink will be left as a mere film upon the skin when so scraped, and will have the opportunity all night of drying hard, which is undesirable. Such drying being prevented to some extent if the body of ink be left on. In reply, we may state that when an article is reprinted from a contemporary, we print it as far as possible in its entirety so long as we feel that there is nothing outrageously wrong about it. The whole article is novel in its treatment, and it was inserted to shew what different practices prevail in distant parts. We do not feel bound to support or endorse the article in every detail, and we take this opportunity of expressing a certain amount of dissent with its general tenor.

On the point of scraping a roller *every* night, we do not agree. A roller well broken-in with lard should bear scraping clean two nights a week. A roller broken in with too much varnish will always have a tendency to brittleness, which would be increased by a nightly scraping. As will be seen from the answer to the query in No. 1, page 35, we are of opinion that there can be too much care bestowed

PRINTED WITH A. B. FLEMING & CO.'S LITHOGRAPHIC INK

upon rollers. Washing and scraping rollers is something like washing out work—if carried to a great extent—it destroys the nap and takes the nature out of the skin.

MR. CAMERON, of Paisley, remarks that he has found the recipe for liquid transfer ink given in answer to question No. VIII., p. 16, BRITISH LITHOGRAPHER No. 1, quite useless. In reply, we are bound to state that the true composition of the ink in question, as made at the present day, is not very publicly known, and so far as we are aware has not been published. Before giving the answer referred to, considerable time was spent in making enquiries, and it was not until compelled to go to press that we fell back upon the recipe of the ink used by André, and which bore Senefelder's testimony as a reliable one. The failure may have arisen from several causes. The paper written upon may not have been sufficiently sized, and the ink has soaked in; or, on looking at the recipe, it may be that the quantity of tallow is far too small. In our opinion the tallow should be increased to 4 ozs. and the shellac reduced to 8 ozs., or less. In preparation, the lac should be added to the molten tallow, whilst the mastic and soda dissolved in water should be slowly added to the warm tallow and lac; finally, the black should be added. Then it may all be boiled up together—but we fail to see how it can become well mixed without the addition of one or two ounces of dried soap, before the soda and mastic.

Mr. Cameron also points out that in patching up a 32-page pamphlet (see answer to question V., page 18, BRITISH LITHOGRAPHER No. 1) the method of the lithographer is opposite to that of the typographer. We hope our correspondent has not overlooked the fact that the question refers to stones and not to transfers.

IN reply to "Anxious to Learn," we are unable at present to say definitely what is the cause of the mischief. We are of opinion that the colouring in the paper is the cause, but defer a final opinion until we receive two sheets of the paper for analysis. It would also assist us to know if the paper is received with the grain on from the maker, or do you print the grain, and is it to the printing of the grain that you refer in your enquiry? If you print the grain, please state the price and the maker of the ink.

IN reply to "W. S. W.," we refer you to two articles on "Bronzing and Dusting" and on "Ivory Carton Printing" which will appear in our next issue. The paper referred to is thin and has a hard impenetrable enamel, therefore use a good ink, thinned with oil of lavender, oil of cloves, or even terebene, and do not omit to use a touch of flour paste. There is one thing in connection with the rollers, although it may not in this case have anything to do with it, and that is, see your damping rollers are even and your inking rollers not too hard with ink being left on.

IN reply to Messrs. H. V. Clements & Co., we can state that Messrs. Winstone, of Shoe-lane, London, supply every requisite for photo-mechanical printing processes in the way of apparatus. Pure photographic chemicals, which can be relied upon, can be obtained from Messrs. Chapman, Albert-square, Manchester.

MR. C. STEWART, of Glasgow, writes to point out the possibility of recipes being misleading, if it is omitted to state whether the measurements are by weight or bulk. We agree with his suggestion, although we think that bulk measurement is so seldom used with such materials as soap, resin, tallow, shellac, and other such dry goods, that errors would be rare.

AMERICAN LITHOGRAPHIC STONE.—The Sioux Falls Granite Stone Company has bought the treasury stock of the American Lithographic Stone Company, which holds the leases on the lithographic stone quarries recently discovered at Hannibal, Mo. The Sioux Falls Company has obtained control of the 2,000 acres and $1,000,000 stock as originally incorporated, and will commence quarrying the stone at once. The supply at Hannibal is said to be almost inexhaustible, and it is claimed to be the only deposit yet discovered in America.

THE stained-glass window of the famous Furness Abbey used in this issue as a medium for shewing some of Messrs. Mander Brothers' coloured lithographic inks is one of the numerous illustrations in Richardson's "History of Furness," two vols., 4to, published by Mr. H. Gaythorpe, Harrison-street, Barrow-in-Furness. The work has been honoured by the approval of Her Majesty, who purchased a copy for the Royal Library.

WE hear that the firm of Messrs. Hobbs & Sons, Kent Paper Works, Maidstone, has decided to reduce its artists' department, and for the future have the almanack and other work mainly done by trade lithographers. The result has been that the leading artists —Messrs. Seeley Brothers—have taken offices in Fleet-street, London, and have had so much business, over and above that sent from Maidstone, that they are in quest of good class chromo artists to keep abreast of the orders in hand.

AMERICAN LITHOGRAPHERS are raising a substantial fund for the relief of the families of the victims of the recent disaster in Park-place, New York. It now appears that all of the staff of Messrs. Liebler & Maas, lithographers—who occupied the top part of the building, and whose heavy presses and litho. stones are supposed to have precipitated the collapse —were killed except three. The principals were absent at the time.

FOR NO. 3.

THE next occupant of "Our Portrait Gallery" will be MR. JOHN BLAKE, principal of the eminent firm of BLAKE & MACKENZIE, of Liverpool, well-known for the beauty of the work they turn out for florists' catalogues, show-cards, calendars, etc. They are preparing a handsome chromo supplement to accompany the portrait and notice. At the same time will be given, as the first of a series of notices of the lithographic technical teachers, a portrait and notice of MR. J. HONEYMAN, teacher of the Liverpool class, who is foreman of the litho. department of Messrs. Blake & Mackenzie's business.

Correspondence.

To the Editor of THE BRITISH LITHOGRAPHER.

DEAR SIR,—On reading over the questions given at the Examination in Lithography of the City and Guilds of London Institute, I am somewhat surprised at the questions asked and the replies expected from intending candidates for the certificates granted. As an old practitioner, perhaps I may be permitted to make a few remarks as to the utility and benefit of these examinations, if I may judge from the questions themselves.

I am not one of those who maintain the old thumb and rule system, as I have always advocated "technical training for the art." Therefore I may be exempt from the charge of being wedded to any old-fashioned system. But I certainly must protest against the idea that such answers and such questions as put forth by the examiners of the City and Guilds in Lithography are in any way capable of training highly cultured workmen. Let me here observe that lithography is unquestionably a chemical operation, whatever others may call it. The inventor of the art—Senefelder—called it chemical printing, and he was himself a first-class chemist, though in a measure self-taught. Therefore the questions that would naturally occur to be put to those seeking certificates of merit in their art should participate largely of a chemical character. In fact, I hold that every lithographer, be he artist or printer, should be somewhat of a chemist, or at least have some good chemical knowledge. I do not find fault with the questions asked (all necessary to know) but with their simple character. Many of them, at least in the first grade, could be answered by any boy fresh from the sixth standard of the school board, and the more technical questions, such as the chemical composition, &c., &c., got out of any chemical dictionary at the nearest free library. Lithography is no doubt colour printing of the highest type, and therefore requires much knowledge of colour in the abstract. The mere knowledge of what is the chemical composition of colour pigments is not all that is required to be known. One of the questions in Ordinary Grade, No. 3 in the list, rather confused me, if it did not astonish me, viz., "What proportion of varnish, and what kind, would you mix with a 3/- black ink..." &c., &c. I ask if this is meant seriously as a test question? I have been told and know from my own experience that it is difficult to tell the price of inks; some say you cannot get a good black ink under 5/-. I see in the advertising sheets an enterprising ink maker offers a litho. ink at 1/- per lb., which he says is as good as that usually sold at 3/-, and therefore I ask the question, "What is the standard for 3/- ink, and where are you to draw the line?" As to the other questions, about etching stones and the difference between a lithographic crayon and a stick of lithographic ink—why, sir, he would not be a lithographer at all, or worth 10/- per week, who could not answer this at once.

The Honours Grade appears to me to be nothing more than questions on the process-block system, and not lithographic at all, unless that appertaining to the photo-lithographic process! Also question No. 3, as to the mode of preparing a leather tympan for use, I ask again, is this seriously a question? In my younger days, the small boys in the establishment that I was connected with could readily have answered this, and an "old soldier" who was employed at the same establishment as stone polisher generally performed this highly technical and difficult (!) operation to the entire satisfaction of his employers.

No; I think the examiners, whoever they may be, have missed the main features necessary in developing the art in their mode of examination. Does it not occur to them that the more important part is that which relates to the chemical portion, not only to the constituent composition of colour pigments (which are no doubt important) but what is of still more importance—their chemical action on one another when printed; the destructive effects of foul air, heat, light, &c.; their permanency and fugitiveness; the qualities of paper that should be employed to get good colour printing, &c.? These and other such like questions are far more important in lithography I should say than such as No. 8 Honours Grade: "Describe the process of mezzotint engraving on copper?" Yours truly,

London, *19th October, 1891.* P. B. WATT.

To the Editor of THE BRITISH LITHOGRAPHER.

DEAR SIR,—Observing your remarks in the first issue of THE BRITISH LITHOGRAPHER on the zinc plates made by the Patent Lithographic Plate Co., Hull, I venture to send you a small plate made by the above Company, upon which I have transferred the Company's heading, and from which I have printed a few impressions for your inspection.

I have had some little experience on some of the zinc plates which have from time to time been introduced to the litho. trade, but have found none so perfect as these, and from considerable experience with them, I can with confidence recommend them to any litho. printer. They will stand very long runs in machine in any coloured ink on the finest class of work, and retain the finest parts of the drawing to the end. I have worked 19,000 circulars with the same transfer heading as the one I now send, and the last impression has been nearly as good as the first; I now have the plate by me from which this long run was taken, and hope to work thousands more from the same. I should like to have your comments on the impressions I now send you, and should like you also to have the plates tested by any practical lithographer. Yours most respectfully,

48 Pendrill-street, Hull, EDWIN T. BEAL.
October, 1891.

[THE plate sent by Mr. Beal is certainly all that can be desired in a printing surface, and the impressions could scarcely be better under any circumstances. The plate is the same from which the supplement of the Company in this issue is printed, so that our readers can judge for themselves. It is a new plate and has since had 7,500 copies printed from it, which we carefully inspected and found the last sheets quite as good as the first.—ED. B. L.]

Specimens.

[*Will our friends kindly remember to send their specimens either* TIGHTLY ROLLED *or* FLAT BETWEEN BOARDS; *the cost is but a trifle more, and for review they gain in being presented as they came from the machine. If sent unprotected, specimens are usually so crushed and disfigured as to be utterly unfit for criticism or preservation.*]

AMONGST specimens of chromo work from abroad, those from Herr Ernst Wasmuth, Berlin, are conspicuous for rich, brilliant, and yet delicate colouring, and admirable technical execution. Some pages of a reproduction of an ancient missal (4to size), with semi-borders and initials in colours on solid gold grounds, are amongst the best in this class of work that we have ever seen, and both technically and artistically are as near perfection as possible. Two sheets of designs of the German imperial and royal crowns and other insignia are equally good in their way, though less elaborate in style.

MESSRS. CHORLTON & KNOWLES, Manchester, are doing some of the finest commercial lithography turned out in Cottonopolis, and are noticeably successful in harmonising it with letterpress. Amonst the best of these are—an illustrated list for a large firm of patent bobbin makers, the patterns in which are in no less than twenty printings, and another of ladies' clothing, in which the illustrative figures are daintily worked out in tints. In every instance the technical execution is equal to the artistic taste shown in design and treatment.

A NEW specimen book of collotype prints from Messrs. Bemrose & Sons, Derby, contains a number of fine examples in interiors and machinery groups, a characteristic portrait—apparently reproduced from an oil painting, and a fine view of Handel's organ, all admirably executed. Messrs. Bemrose's collotype work is amongst the very finest executed at the present day, and they are doing much to forward the time when collotype will become the leading medium for illustrative purposes for books and magazines.

SOME designs for office calendars from Herr Carl Flemmings, Gera, are good in design and colour, but rather below the mark in finish of execution. The most effective is an upright calendar, the border representing the seasons, and at the top a lively group of cupids with a cornucopia. In the centre panel is affixed a weekly leaflet block with space for memoranda.

THE business card of Messrs. Matthieson & Erskine, Glasgow, is a very neat bit of work, the lettering—mostly in latin characters—clear and distinct, and the monogram in the panel on the left-hand side very tastefully grouped, while the ornamentation is chaste and in keeping with the rest of the design, and the printing well up to the mark.

SPECIMENS of work in black, printed from the patent lithographic zinc-plates—of which one is given as a supplement in this issue—by Messrs. Goddard & Sons, of Hull, are equal in every way to the best work from stone. The printers speak in terms of high commendation of the excellence in printing and economy in working of these plates.

THE new wall calendar for '92 just produced by Messrs. Blake & Mackenzie, of Liverpool, for Messrs. John Laing & Sons, the well-known nurserymen, of Forest Hill, S.E., is a splendid specimen of chromo-lithographic art work. It represents a group of rich floral beauty arranged in artistic confusion on a marble slab in front of a crimson curtain, the calendar let into a white panel on the left-hand side, and the publisher's name and address at the foot in neat, clear lettering. The colours are remarkably brilliant, yet soft and delicate, and the technical execution is simply perfect down to the smallest details. It is astonishing that so much work of this class goes abroad while there are houses at home capable of turning out such finished productions.

OUR esteemed correspondent, M. Valette, of Lyons, favours us with some specimens of his work, including several of the plates printed in his "Manual of Lithography." A large sheet shewing a number of designs in cards, memo. and invoice headings, diplomas, etc., in various styles, shows not only tasteful drawing and treatment, but excellent technical manipulation. The sheet is printed in one colour only —black, but grey, buff, and azure tint grounds are so tastefully introduced in panels and borders as to give it quite a pleasing and attractive appearance. The printing is excellent.

A DECIDEDLY artistic bit of copper engraving is the business card of Mr. W. H. Edwards, of Edmund-street, Birmingham. The very neat lettering is in panels in the midst of a background of flowing ribbons and sprays of foliage tastefully intertwined, and the printing has been done direct from plate in dark-brown on deep-toned deckle-edge card, the ample margin assisting the general pleasing effect. We should be pleased to see more of your work, Mr. Edwards!

MR. THOMAS BROAD, St. Bride-street, E.C., submits specimens of commercial and other work, including several of his own business cards, all of which show excellent treatment and finish in all branches of execution. Mr. Broad is evidently right up to date in his methods of working: such uniformly good results are a pleasure to see in these days of "rush."

SPECIMENS of commercial lithography from Messrs. Laurence Brothers, Weston-super-Mare, in cards and invoice headings, are excellent in tasteful lettering and drawing and clear sharp printing. Better work of its class could scarcely be had. The collotype prints in Messrs. Marion's catalogue are exceptionally good.

AN examination card for the Wesleyan Day Schools, Lower Broughton, executed by Messrs. G. Wheeler & Co., Manchester, besides being a neat design, shews a very tasteful effect for three printings—chocolate, grey, and gold on rose-pink tinted card. Drawing and workmanship excellent.

MESSRS. W. R. ROYLE & SON, 96 Newgate-street, London, E.C., send us a capital collection of work done by them as designers and engravers. Amongst them are many in the taking American style of design, presenting a variety of fresh and original effects. Messrs. Royle & Son are in the front rank undoubtedly both as artists and engravers. They also execute steel and copperplate printing for the trade.

The Amalgamated Society of Lithographic Printers.

THE eighth Anniversary Dinner of the Worcester Branch of the above society took place on Saturday, October 17th, at the Alma Inn, Lowesmoor. The members and friends present, numbering upwards of 20, did ample justice to the good things provided by Host Hiron. In the unavoidable absence of the General Secretary, Councillor G. D. Kelley (of Manchester), Bro. A. Marshall, Branch Treasurer, presided, and Bro. T. S. Gerrett, B.S., occupied the vice-chair. After the loyal toasts had been duly honoured, vocal and instrumental selections were given. In proposing the toast of the evening, "Success to the Amalgamated Society of Lithographic Printers," the chairman briefly alluded to the progressive growth of the Society, numerically and financially, during the past decade. The vice-chairman, in responding, congratulated the Worcester Branch on the proud position it occupied. Fifteen years ago their honourable craft was represented by two men and an attenuated boy. To-day they had upwards of fifty hands directly engaged in solving the familiar problem of getting their daily bread out of stones. It was gratifying to know they had escaped the periodic waves of depression which had been so keenly felt in the large centres of their own industry. During the past eight years they had paid some £35 in unemployed benefit. Sickness in that period had encroached upon their funds to some £45. Their management expenses had always been well within the prescribed limit of their Executive Board. The *morale* of the branch, he was happy to say, was not excelled by any branch of the organisation, and he hoped, in conclusion, that no exertions would be wanting on the part of those he had the honour of addressing to induce the younger and coming race of men to identify themselves with their Society's movement. The remainder of the evening was devoted to harmony and conviviality, and terminated with votes of thanks to Host Hiron for his effective catering to their evening's pleasure. Mr. N. Zeyen kindly filled the *rôle* of pianist.

Proposed Provincial Stereotypers' Society.

THE stereotyping department of the printing trade is about the only branch that is not represented by a society, and we are pleased to hear that some efforts are being made to form an association which will be the means of assisting them in trade and various other matters. The work of such a society would be beneficial to both employer and workman. Mr. Thos. Jno. Thomas, stereotyper, of the *North-Eastern Daily Gazette,* Middlesbrough, has issued a circular to the trade containing suggestions on the subject, which we hear is being heartily taken up by stereotypers everywhere, and the result may be looked for shortly in a call for a meeting in some central town to consider the matter. Those interested should write to Mr. Thomas, to whom we wish every success in such a good cause. Union is best for both employers and employed.

The Carlisle Mayoralty.

THE following paragraph is of interest to our readers for the reason that the Mr. Scott mentioned in it is Mr. Benjamin Scott, senior partner of the well-known firm of Hudson, Scott & Co., litho. printers. Tullie House is to be a free library, museum, and school of art and sciences for Carlisle.

"The selection of a new Mayor is usually put off until the elections have been held, but this year, though there are contests in four of the wards, it is felt that no change can possibly occur which will affect the general desire for Mr. Scott's re-election. It is fitting that he should preside over the first work for the transformation of Tullie House, and it is hoped that his occupancy of the office at that time will be as agreeable to himself as it certainly will be to the public. The resolution of the Committee yesterday will, therefore, be heartily approved.

"Looking further into the future, it is intended to take advantage of the Prince of Wales' visit to Lowther to invite his Royal Highness to open the institute when it is finished. The Prince's desire to give *éclat* to important undertakings of this kind is well known, and though it is risky to make an engagement so far ahead, a promise to be present on the great occasion, provided no more urgent call arises, will be received with the very liveliest satisfaction."—"X.Y.Z." in the *Patriot.*

AMERICAN COMPETITION.—We are informed by an extensive cigar manufacturer, that neither English nor German printers can compete with Messrs. Harris, of New York, in producing the vast supply of cigar box labels used in this country. It is not price that stands in the way, for the sets of labels on each box range now in cost from 3d. to 6d. and even more. What is wanted is the quality of paper and regularity in every impression. Not long ago a contract was given to a German firm, but, when delivered, the manufacturer returned them as irregular in production and wanting in quality in the paper. Seeing that the vast majority of "fine imported cigars" are "made in England," there is great scope for English printers to turn their attention in the direction of having the labels "printed in England" also.

SPECIMEN OF ORDINARY MACHINE COLOUR PRINTING AT 1260 SHEETS PER HOUR.

A. J. Moore, Her Majesty's Colour Printer, Leeds.

P.T.O.

THE BRITISH LITHOGRAPHER

A JOURNAL FOR LITHOGRAPHERS · ARTISTS · DRAUGHTSMEN · PHOTOTYPERS · STEEL & COPPER-PLATE · ENGRAVERS &c.

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UNFAIR!

SOMEONE has recently been industriously circulating a report that the De Montfort Press (the office of this Journal) is an "unfair house."

So far is this from being the case that the President and three of the Committee of the local Branch of the Typographical Society are all working in our office, and every journeyman is a member of the Society. To many of our men we pay higher wages than the Society rates of the town, besides paying for all public holidays, wayzgoose expenses, etc., and subscribing to other matters for their advantage, as well as having inaugurated a profit-sharing scheme for their benefit.

The full wages of the town are also paid in our Binding Department, and all the binders are Society men. All but two are, in fact, receiving more than the current wages of the town.

Our Litho. Department is not yet fully organised, but such engagements as have been made are with men belonging to the trade societies.

We are strongly in favour of trade union principles, believing, with the late Mr. Blades, that they are mutually beneficial to employers and employed.

Photo-Mechanical Lithographic Printing Processes.

CHAPTER II.—Half-Tone Photo-Lithography.

This half-tone process of lithography is coming very much to the front, owing probably to the impetus given by the large production of prints in half and quarter-tone by collotype and etched zinc-blocks. It is difficult to see that half-tone lithography can ever possibly have the call which has been the lot of the photo-zinc, and where expense is not limited, it certainly will not eompare with collotype for accuracy of production and natural effect ; but there are undoubtedly many instances in which it is useful, especially in combination with other lithographic work, and where the subject is to be finished in chromo-lithography.

The advantage claimed for half-tone photo-lithography is speed of production, coupled with the fact that the transfers can be prepared from negatives, taken from wash-drawings or from nature, similar to the collotype process, but the result is considerably inferior and it will require the exercise of greatly increased skill to produce work of anything like a passable character. The difficulties of the process have deterred many from attempting it, but now that the mother process of photo-lithography in line is so largely practised and so well-known, there should be many who will turn their attention in the half-tone direction and bring it up to something nearer perfection than at present. We do not for one moment infer that work is not done at present of a high class, but the quantity is very small as compared with the excellent line work which is executed all over the country.

Half-tone processes in one form or another have been experimented upon for a number of years. There was the process of dissolving bitumen in ether, and coating it upon metal plates or lithographic stones, described by Nièpce, before silvered plates in photography were used. In this process, the sensitive bitumen coating was exposed under a negative, and after a very long exposure, reaching sometimes as much as three days, the picture was developed by dissolving the unexposed portions with turpentine and benzine. Notwithstanding that by this means a beautiful picture could be obtained, yet it and other direct processes have been abandoned in preference to the transfer methods. The process described above has not been lost, for it is now most successfully practised in the preparation of the photo-zinc blocks and copper photo-etched plates.

Another method more closely resembling photo-lithography in line has been attempted, by coating a stone with a mixture of gum arabic and potassium bichromate, which, when dry, is exposed under a negative, and is finally washed out with water. It is then rolled up with ink, and so long as the film retains its hold upon the stone, impressions may be taken, but this does not last long. Closely allied to this process is that of Morvan, in which a mixture of :—

Albumen	20-grs.
Water	30-grs.
Potassium bichromate	5-grs.

is coated on a stone and dried. It is then exposed under a negative. In development the procedure is one with which few are familiar. It is first washed with soap solution and cleansed with pure water ; after which it is rolled up and gummed, being left in ink and gum for some time previous to proceeding with the printing. A somewhat similar course was pursued when a mixture of :—

Water	1-quart.
Potassium bichromate	160-grs.
Sugar	160-grs.
Gum arabic...	4-ozs.

was compounded and coated upon a stone. The coating being allowed to dry, was exposed under a positive (not as before, a negative). The positive picture thus super-imposed, renders the whites of the picture insoluble in water after the exposure is complete, whilst the picture itself is left soluble. In the washing out of this exposed coating therefore, the picture is washed out and leaves the stone bare. In this state it resembles a stone with the background on, and with which the stone engraver has finished preparatory to filling the cut lines with oil. The photographic picture, however, is treated with soap, instead of an oil as in the engraving, and the soap soaks down into the clear spaces, ultimately getting to the stone and leaving a fair picture upon its surface. If this process were applied to copper-plate or steel-plate etching, and instead of an oil, an acid were allowed to work through the positive picture, it is very probable that some very satisfactory results might be obtained.

The process just described bears the nearest analogy to half-tone *lithography* that had been attempted, and is far in advance in that respect of any process in which the stone is covered with a sensitized coating and exposed under a negative. The latter methods are really collotype, and were it not for the cumbersome nature of stones, they would in all probability have been retained as the support for collotype films instead of glass or metal as at present.

Having thus detailed some of the older attempts, from which the careful reader may gather some useful hints, it is necessary to pass over these direct processes and deal with the (so far) only successful mode of procedure by the transfer method.

The paper for half-tone transfers has to be prepared with a sensitized coating similar to that used in photo-lithography in line, excepting that the gelatine should be harder. After the transfer paper is made and stocked it can be made ready for use just before exposing under the negative.

But, in making this paper ready several methods may be employed, and others may suggest themselves to those who enter into the process with any spirit.

Seeing that to expose a flat piece of paper under a half-tone negative would simply result in the production of flat tints upon the transfer paper, which when transferred would run solid, it is necessary to have the face of the transfer paper cut up by granulation in order that the tints will also be cut up. The methods adopted may be (1) as in taking the negative photograph for the zinc-block process, by the intervention of a cross-lined or dotted screen in the camera between the object and the plate; (2) by impressing a dot, stipple, cross-line, or grain upon the face of the transfer paper before it is exposed; (3) by using a transfer paper, the composition of which when dried at a high temperature becomes reticulated and presents a very uniform granulation; (4) by printing upon the surface of the transfer paper a fine grain, dot, stipple, or cross-line, which in development washes out, or (5) by using a transfer paper, the composition of which becomes granulated in the act of exposure under the negative. Of these methods the first (1) and second (2) are not as satisfactory as the others, especially the fourth (4), for whilst they by their over-decidedness destroy many of the contrasts, the fourth method, especially in grain, allows of a far greater amount of the picture appearing on the transfer, and does not cut out so much of the high and middle lights. The third method (3) is surrounded with so many chances of failure, that unless the manipulator is prepared to exercise an extraordinary amount of care, skill, and patience, the results will be discouraging. The fifth (5) method is easier of accomplishment and is known as "Husband's Papyrotint Process," which will be dealt with first.

CHAPTER III.

Husband's Papyrotint Process.

This process closely resembles ordinary photo-lithography in line, in its manipulation, excepting that the transfer paper composition is different, to provide for the chemical change which causes the reticulation Any good negative may be used, such as would be used for a silver print, whilst the process itself is specially adapted to town views or for architectural purposes, and may be used with success for subjects from nature.

The preparation of the paper requires much the same manipulation, apparatus, and chemicals as already described in photo-lithography in line, chapter I.

A hard, well-sized writing paper is coated by floating it on a bath of :—

Gelatine (X opaque)	8-ozs.
Glycerine	1½-ozs.
Common salt (NaCl)	2-ozs.
Water	50-ozs.

This bath should only be moderately warm, and the mode of coating already described by rolling the paper and allowing it to unroll on the bath should be carefully followed to exclude all possibility of bubbles. Instead of hanging the paper to dry after coating several times, it is put into the drying cupboard (fig. I.) and dried at 90° F (32·1°C). Paper thus coated can be preserved in a dry cool place for years, just as the semi-prepared paper for line work of Professor Husnik may be kept. The drying of this paper, however, takes as much as ten hours, owing to the large proportion of glycerine in the composition.

When required for use, the paper is immersed face upwards in a bath of :—

Potassium bichromate	1-oz.
Common salt (NaCl)	½-oz.
Water	30-ozs.
Ferricyanide of potassium ...	100-grs.

By increasing the quantity of the ferricyanide of potassium, the granulation will be coarser.

The bath need not be used in the dark room, but as soon as the paper is removed it must be dried at a temperature of 70° F (21°C) in the drying cupboard (fig. I.) and in the dark room. Drying the paper at a higher temperature than 70°F causes the grain to be coarser.

The dried paper is then ready for exposure. As previously stated, any good half-tone negative will do, preferably one in which there is no lack of details, and an absence of monotony of tone. The timing and appearance of a properly exposed transfer is as already described in chapter I.

When the exposure is complete, the transfer is well soaked in cold water. The gelatine is thus allowed to absorb as much water as it is capable of, and swells. In swelling, it assists in breaking up the picture; for during exposure the light has been acting upon the composition of the paper, and causing it to become reticulated or granulated, owing to the crystallization of the ferricyanide of potassium. The swollen gelatine has simply opened the reticulation, and when dried does not shrink to such an extent as to cause the picture to run together again. It is at this stage of soaking that the reticulation can be made coarser by adding hot water to the bath. The hotter the water the coarser the grain.

The transfer having been dried between clean blotting paper, a very noticeable difference is made. The transfer is not soaked as in line work, to remove entirely its sensitiveness to light, this property being brought into requisition at a later stage. Again, instead of rolling the transfer with a roller—an operation which, however carefully performed in *any* photo-lithographic work, does not give the best results—the picture is gently rubbed over with ink in a sponge. The ink, which is a hard transfer ink specially prepared, is reduced with turpentine to allow of the use of it in a sponge. By this means a thin film of ink is spread all over the paper, making visible the picture and the granulation. Instead of washing the unexposed gelatine out at this stage, and thus removing the ink from the unexposed portions, the ink which is upon such portions is removed by rolling the whole transfer carefully and steadily with a letterpress roller charged with a little of the same hard transfer ink; by this means the high lights and shadows are properly cleared, the transfer is allowed to lay a few minutes for the turpentine of the ink to

evaporate and is then immersed, for a few minutes only, in a weak mixture of potassium bichromate and tannin. From this bath the transfer is removed and dried in the dark room, after which it is exposed for a few minutes to light, thus hardening all the surface which has retained any sensitiveness.

In the process of transferring, it is treated somewhat like an autograph transfer, the back being well damped with a weak solution of oxalic acid, and finally partially dried in blotting sheets. Considerable care has to be exercised in treating these transfers on stone. In the first place, after transferring it should be allowed to rest a few hours before rolling up, and the ink used for rolling up should not be too powerful at first.

The reticulation obtained in this process can be made coarser by heating the paper previous to exposing under the negative.

The transfer ink used for inking up these transfers is prepared by melting in a pan :—

White wax	½-oz.
Stearine	½-oz.
Resin	½-oz.

and subsequently adding

Chalk printing ink	4-oz.

This ink may be conveniently compounded over a gas-stove. In use it is reduced by adding pure turpentine.

[*To be continued.*]

1,260 Runs per Hour at Machine.

Thus reads an advertisement in our last issue. We are in no way responsible for the statement, but it has caused a good deal of editorial correspondence with both employers and employés, and in justice to both we give the matter notice here. Only one of the letters received on the subject was of a character that we could print, and we do so the more willingly as the writer is a well-known authority and speaks from the vantage ground of position and experience.

To the Editor of THE BRITISH LITHOGRAPHER.

SIR,—Having seen a statement at the foot of Mr. Alf Cooke's supplement leading the reader to believe that the supplement picture in your last issue was printed at the rate of 1,260 runs per hour, allow me to say, from my own knowledge of its production, that this is an absolute misstatement of fact, and that it was not produced at a greater speed than about half that number.

My sole reason for calling your attention to this matter is to remove the feelings of dissatisfaction which have been generated in the minds of many employers respecting the speed at which their own machinery runs as compared with this fabulous statement, and I should like to assure them through your columns that no work is ever produced at anything like the speed named. GEO. D. KELLEY.

73 Upper Brook-street, C.-on-M.,
Manchester, *Jan. 23rd, 1892.*

Here we have a flat contradiction to Mr. Alf Cooke's printed statement, and from our own knowledge of the business we believe Mr. Kelley to be correct.

It is natural to ask, CAN IT BE DONE?

Let us turn to plain fact. Where is the litho. machine that can be run at a greater speed than 900 per hour and do good work? Even at such a speed it is totally impossible to produce anything but grocers' tea papers or paper bags, or clothiers' puzzle cards. But machines cannot be run at this speed year in and year out even on that work, and if we put down 750 to 800 runs per hour at the most, we are, we believe, over-rating possibility.

The older machines and many of the new ones, too, are not calculated for a greater speed than 500 to 600 runs per hour when working on decent colour work, and when it comes to really good and tasteful chromo-lithography, with a number of delicate tints and the necessity of fine register, it would be a good day's work to turn out more than 500 runs per hour. Every establishment is not run on the same lines, and there are very few where a man is constantly preparing the work for the machines, the machinemen simply having to clean up and go ahead on a new colour.

What seems far more likely, is that the print was patched up, four on a stone, and that *1,260 impressions, not runs,* were really turned out in the hour. This is perhaps as wide of the mark as the original statement but it is at least quite as reasonable.

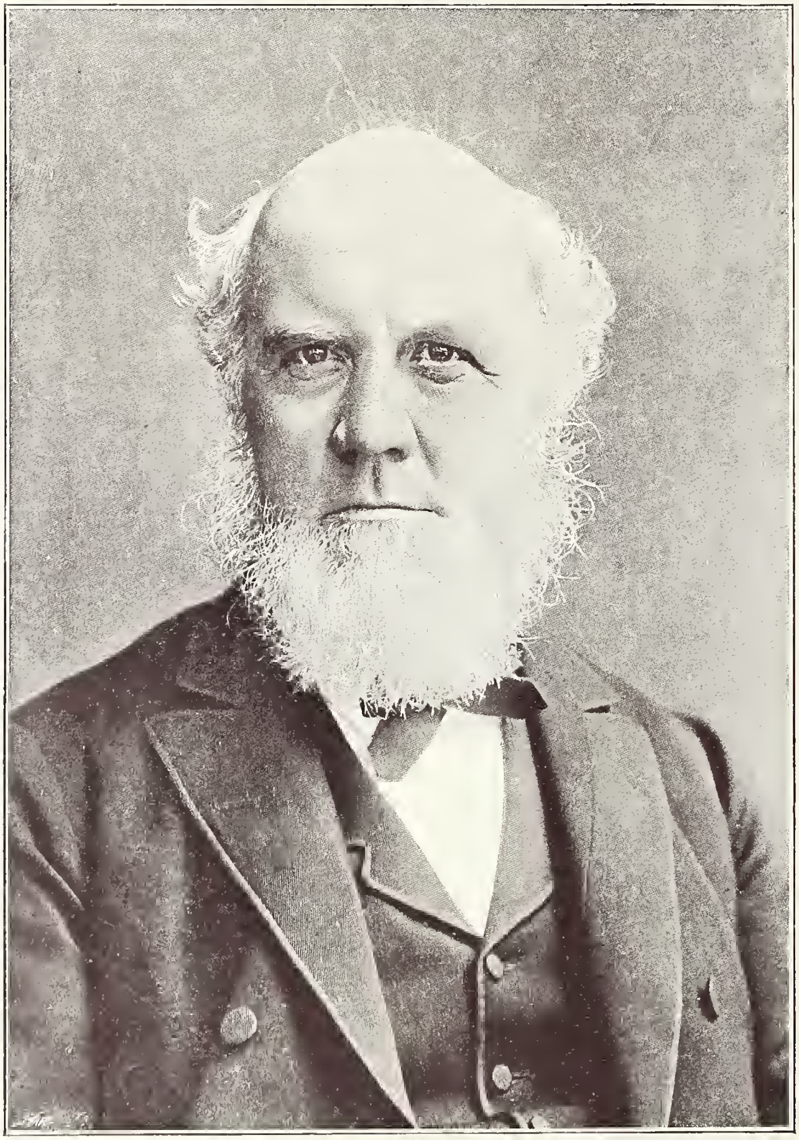
It behoves advertisers, in their own interests, and in the interests of the trade, to be cautious in putting erroneous statements into the hands of those who know better or into the hands of the public generally.

Zinc Printing.

THE GREATEST DIFFICULTY OVERCOME.

Amongst the many discoveries and novel applications which are constantly being made in connection with printing from zinc-plate, one of the smartest and simplest has been made by Mr. Arthur T. Moses, of Manchester. He is a firm believer in the use of alum solution on the stone, and his experience in that direction has always been eminently successful. He has applied the same treatment to zinc, and with corresponding success. All who have had experience with zinc know that even drawings upon zinc cannot always be rolled up solid, especially is this the case with large masses of solid work. Again, transferring to zinc and putting down off-sets are always attended with such a great amount of uncertainty as to make the use of zinc one series of embarrassments and failures. It is here that the application of alum, as proved by Mr. Moses, comes in and smoothes the difficulties away.

The zinc having been prepared by polishing, or purchased polished, is covered with a solution of nitric acid and alum in boiling water. This solution is prepared by dissolving 1-ounce of alum in 1-quart of boiling water, and finally adding ¼-ounce of nitric acid. The boiling solution is poured upon the plate to form a thin layer, which dries almost at once by the heat of the solution. A plate thus prepared will receive transfers of the finest work, and no difficulty attends the putting down of off-sets.



William Blake.

&C.R. Ltd.

OUR PORTRAIT GALLERY.

Messrs. Blake & Mackenzie, Liverpool.

With this number we have pleasure in presenting our readers with a portrait of Mr. William Blake, the founder of the eminent firm of Blake & Mackenzie, Liverpool, known throughout the world as the pioneers of horticultural printing and speciality stationers.

Acquiring an extensive knowledge of the printing and stationery business, Mr. Blake established the business in Glasgow in 1850, subsequently being joined by Mr. John Mackenzie, who continued to take an active part in the business until his demise, several years ago. Cultivating the requirements of the seed trade, it gradually developed, and in 1865, seeing the advantage of occupying a more central position, the firm removed to Liverpool, and eventually occupied two flats of what now constitutes the main building. Since then it has, through the energy and keen perception of Mr. Blake, steadily advanced step by step, machinery and other plant being added at intervals, and more space being acquired, until the whole of the large block is occupied, and at the present time the firm have two other branches in Liverpool, employing altogether between three and four hundred hands. The frank and kindly characteristics of Mr. Blake are admired by all who approach him, and have won for him the warmest respect and esteem of all the employées, among whom complete harmony exists all over the works. It may be here mentioned that a number of hands have been upwards of thirty years in the firm's employment.

The late agitation for a reduction of working hours in Liverpool and the midlands in no way affected Messrs. Blake & Mackenzie, the firm having conceded the 51 hours nearly twenty years ago—an example worthy of the leading firm in Liverpool.

Mr. Blake is assisted in the discharge of his arduous duties by his son, Mr. Henry Blake, his extensive knowledge of the business eminently qualifying him to take such an active part; and also by Mr. John Bartholomew, whose energy makes him a decided acquisition to the firm.

The main building is situated in College-lane, which runs parallel with Church-street, the intervening space being occupied by the Liverpool Cathedral, the space surrounding having been converted by the corporation into a public recreation ground, which is much patronised by the employées during the dinner-hour in fine weather.

Passing through the imposing front entrance, to the right are the private offices, where the financial part of the business is transacted. The rooms are comfortably furnished, and through the medium of speaking tubes and telephones the firm is enabled to communicate with the heads of departments at will.

Passing through the general offices on the left, we come to the stock room for pictorial seed-pockets. The firm being the original introducers, and the largest manufacturers in the world, have an immense variety of designs, the magnitude of the business done in this line rendering it necessary to keep several millions in stock, and everything being systematically arranged, orders are executed with the least possible delay and trouble to all parts of the United Kingdom, France, America, and the Colonies. Adjoining this room is the paper warehouse, a spacious apartment with walls of paper for the various specialities, neatly built and arranged with passages to facilitate the work of the warehouseman. Passing through this we come to the workers' entrance, and proceed upstairs to the cutting, binding, and packing departments; a long row of cutting and punching machines is arranged down one side, hundreds of cutters being required for the different sizes of seed-pockets, envelopes, labels, etc.; the other side is devoted to the packing of goods by an efficient staff, who are kept busy packing and sending off goods to nearly all parts of the world, the goods being lowered by a patent friction hoist. The remainder of the space is occupied by men, women, and girls, folding, stitching, and binding the various seed catalogues, etc. There are also folding, stitching, paging, and perforating machines; here also the work of mounting and varnishing showcards and calendars is carried on.

Adjoining the binding department is a large room solely devoted to the storing of chemists' labels, beautifully lithographed bottle-wrappers, and every conceivable line of printing requisite for the business of all chemists. The system adopted to keep everything neat and orderly is much the same as that in the pictorial seed-pocket stock-room, and is the outcome of long experience. Orders in this department are executed under the surveillance of a staff of smart young men specially trained for the work; so complete is the execution of orders, that it is no uncommon occurrence for customers to acknowledge the excellence of the work turned out from this department. The firm's connection in this line extends all over the United Kingdom, and, as with their other branches, a fairly good business is done with chemists in the Colonies.

Proceeding upstairs, we enter the litho. room, an immense well-lighted flat, the front window affording a magnificent view of the Cathedral, with its pleasant surroundings, and also of Church-street, with its never ceasing traffic, where one meets representatives of nearly all nations, many wearing the picturesque costumes of their country. From March to September, long trains of emigrants are seen here, preceded by large heavily laden lorries containing their baggage, all making for the landing-stage. Such sights are part of Liverpool, and fill the stranger with mingled feelings of sympathy for the emigrants and wonder as to the

probable depopulation of such countries as Austria, Germany, Poland, Sweden, and Norway, but still they come, increasing every year. The machines in the litho. department are of various makes and sizes, and are arranged so that the cylinders are all in line with each other. A section of the room is allotted to the patching, shining-up, and transferring. The nature of the work carried on is well known, and is divided into three sections — "chromo," "chemists'," and "general." Here are machines constantly at work on the beautiful pictorial seed-pockets, and the magnificent covers for seedsmen's catalogues with which the name of the firm is identified, floral plates, show-cards, calendars, etc. The firm do an extensive chromo business with the prominent seedsmen of India and the Colonies.

The intricate nature of the chemists' work necessitates special arrangements for the production of first-class work, and the beautiful labels, wrappers, etc., produced in this department worthily sustain the reputation of the firm.

In the general department, there are all kinds of labels and commercial work produced in the best style. There are the usual polishing and grinding machines necessary for the carrying on of such a business, and recently there has been added an improved bronzing machine, so constructed that no bronze escapes: it does its work thoroughly and is much appreciated by the men. The department is ventilated by a patent fan driven by steam power, making 700 revolutions per minute.

Leading off the machine-room is the proofer's room: here are stored carefully away on shelves hundreds of zinc plates containing valuable designs, demonstrating the utility of plates for originals, one hundred scarcely occupying the space of half-a-dozen stones. The entrance to the artists' department is from the proofer's room, where an efficient staff is kept; the ability of the artists is the best procurable. In addition to the litho. artists there is also a "special artist" for sketching and painting flowers and vegetables from nature.

The engine-room adjoins the boiler-house, where all necessary appliances are kept for the execution of small repairs; here also is a circular saw driven by steam power, with an attendant busy at work cutting up wood for the patent collapsible boxes.

The envelope works are situated in Peter's-lane, where is carried on the manufacture of envelopes, seed-pockets, manilla, cloth and waterproof labels, also bottle cases, bird-seed boxes, dry-soap boxes, fly papers for the chemist's trade, and the patent collapsible wood boxes. The manager of this department, being of an inventive turn of mind and a practical engineer, invented and patented the machines which manufacture the seed pockets, he being also the joint patentee of the patent collapsible box.

The fancy cardboard box-making department is in Paradise-street. Nearly one hundred men, women, and girls are employed here. The place is replete with paper and card cutting machines and scoring machines of the latest pattern. Here are manufactured a number of boxes which are the firm's own patent, also several designs which are registered. All three branches are connected by telephone.

Letterpress Department.

The chief interest in this establishment necessarily centres in that branch of the trade with which the firm has been so long identified, viz., seedsmen's speciality printing, and the steady and indefatigable pursuit of which has secured for it an extended and well-deserved reputation all over the English-speaking world. However keen the interest felt by the visitor in the other branches of the works, a "look in" at the letterpress department cannot fail to awaken further gratification. Passing through the litho.-room, up a broad solid staircase, the composing-room is seen to the left, and the machine-room to the right.

The composing-room is situated at the top of the building, and extends, with the adjoining machine-room, the entire length of the building, being illuminated with "Radiant" patent lamps, suspended from the ceiling, at night presenting a very pleasing and healthful appearance. Great credit is due to the firm for their efforts to obtain the best ventilation, making use of every known improvement in that direction, the last outlay being a fan in the middle of the two rooms driven by motive power. The work executed in the composing-room is of a most varied and complicated character, and is divided as follows:—General: seed catalogues and commercial work; Chemist: every conceivable label used in decorating the shop and supplying the wants of the 19th-century pharmacist; pockets and envelopes, all sizes and shapes, to contain seeds of the most minute character to the world-wide post sample envelopes; and the Box Department, for supplying the pleasing cigarette-box adornments exhibited in the tobacconist's window. The machines are of the most modern and approved makes, and in conjunction with the composing-room turn out a huge mass of work, and find employment at this season of the year for upwards of seventy willing hands.

Lithographic Technical Teachers.

Mr. J. Honeyman.

Mr. Honeyman first saw the light in Kirkcaldy, Fifeshire, in 1856; he was educated at the "Burgh" School, and at the age of thirteen he was apprenticed to lithography with the firm of Messrs. John Crawford & Son. Although a small place, the proper routine of bringing up apprentices was strictly observed, the new lad having first to polish the stones, the period of such occupation varying according to the time having to be served by the eldest apprentice. Having "done" his time at the stones, young Honeyman was put to the copper-plate press for some time, and then to the hand printing press. At that time machines were just beginning to assert themselves, and the firm being desirous of keeping pace with the times, ordered a demy machine from the well-known firm of D. & J. Greig, Edinburgh. When the machine was up it was no easy matter then to get a competent man to work it. After trying several and not getting suited, they put on one of their

Supplement to the "British Lithographer"

Designed & Printed by BLAKE & MACKENZIE, LIVERPOOL.

own hands, who got along tolerably well, and in due course was succeeded by the original of our portrait, who for some time transferred the jobs and worked the machine alternately. When a journeyman he travelled a bit, working in Sunderland, Newcastle-on-Tyne, Bradford, and at the end of three years went back to his native town, his early experience of machine minding being of great advantage to him; here he remained for eight months, when he determined to set off again for England, and took train to Glasgow with the intention of going by boat to Liverpool; but seeing an advertisement for a machineman in Glasgow, he applied to Messrs. Currie & Co., where, as the custom was then, he was taken on for a few days, and was ultimately appointed foreman, occupying this position for five years—being ten years with the firm altogether. The principal work produced was spool tickets, a tedious class of work which only those can realise who have had experience in this line. Leaving the firm on the best of terms, he commenced business in a small way on his own account, but trade being dull for an unusual length of time—with consequent low prices, he relinquished the business; shortly afterwards going to Manchester, where he worked for a few weeks before getting his present situation as overseer in Messrs. Blake and Mackenzie's Litho. Department, Liverpool.

During all the time Mr. Honeyman was in Glasgow he was an enthusiastic volunteer, being a member of the 10th L. R. V. Glasgow Highlanders (kilted regiment). He was soon promoted to the rank of corporal, and after successfully passing the examination became sergeant, and gained a certificate for proficiency. He took a great interest in the shooting, both regimental and company, and belonged to the company shooting team nearly all the time, winning several prizes, including a gold medal.

Immediately on coming to Liverpool (four years ago), he commenced to attend the evening classes for chemistry in the Royal Institution, Seel-street, and afterwards in the College of Chemistry, Duke-street. In 1888, he entered for the City and Guilds of London examination in lithography, obtaining the first prize of a silver medal and a first-class certificate; the following year he was appointed technical teacher of lithography, and at once commenced a class in Shaw-street College, under the auspices of the Liverpool School of Science and Technology, and the City and Guilds of London Institute, forty students being enrolled. The following year (1890) the class could not be held in the same place, owing to some alteration in the management of that institution, and a suitable place not being found in time, no class was held. But last year the corporation, taking advantage of the power extended to them by the Technical Instruction Bill, allotted £1,000 to the School of Science and Technology, £500 being for plant and apparatus, the remainder being required for extending and suitably fitting up the building. Mr. Honeyman was successful in obtaining a sum to provide the necessary plant to carry on the work of technical instruction, and hopes to obtain a further grant this year, his aim being to have everything necessary for the practical demonstration of theory in connection with lithography and analogous methods of printing. Mr. Honeyman also advocated technical instruction in typography, and his efforts were rewarded by the committee acknowledging his claim, and granting a suitable allowance for plant, etc.; he was present at the opening of this class, gave a short address and introduced the teacher, Mr. Gartin, who has enrolled thirty students, so that both trades have now their technical class in Liverpool. Mr. Honeyman feels satisfied with the results of his labours so far, and is certain that these two classes will do a great amount of good in Liverpool.

Mr. Honeyman took an active part in the late Polytechnic Exhibition, the object being to raise £1,000 for the promotion of technical education among working men and their sons, in connection with the Walker Engineering Laboratories and University College. He was secretary to the exhibits committee and a member of the executive council. At the close nearly £1,300 was realised. All the various committees being dismissed, a permanent association was founded, called the Association of Working Men for the promotion of Technical Education in connection with the Walker Engineering Laboratories and University College, among working men and their sons; and at present he is a member of the executive council of that body. He received a gold diploma in recognition of his services.

MR. J. HONEYMAN,
TECHNICAL LECTURER TO THE LIVERPOOL LITHOGRAPHIC CLASS.

By Charles Harrap.

CHAPTER II.—*Continued.*

TREATMENT.

The composition of lithographic stone has been briefly alluded to in the opening chapter, but to be better able to understand the business, a closer acquaintance is necessary. Mainly, the stone is carbonate of lime, but there is a difference between this rock and other carbonate of lime rocks, which may be due to the presence of aluminium or to some peculiar circumstances at the time of or subsequent to its deposit. It is however a fact, that whilst lithographic stone resembles in composition, marble, limestone, chalk, and coral, yet it is not perceptibly dissolved by cold water, whilst the others are, to a very small degree. It is in all probability this very slight difference which constitutes the feature that makes this stone alone the one for printing purposes, combined of course with its other characteristics. It is often said, and with a deal of apparent truth, that the basis of lithography is the antagonism of grease and water. But grease and water are antagonistic under all circumstances—on china, on glass, on wood, on slate, on or in almost anything (except metals), yet none of these have ever proved of the least value for printing from. The true basis of lithography is the stone or metal, which will combine with grease to form a compound insoluble in water, and which offers sufficient resistance to take an ink from which this ink is readily given up again on any material pressed upon it.

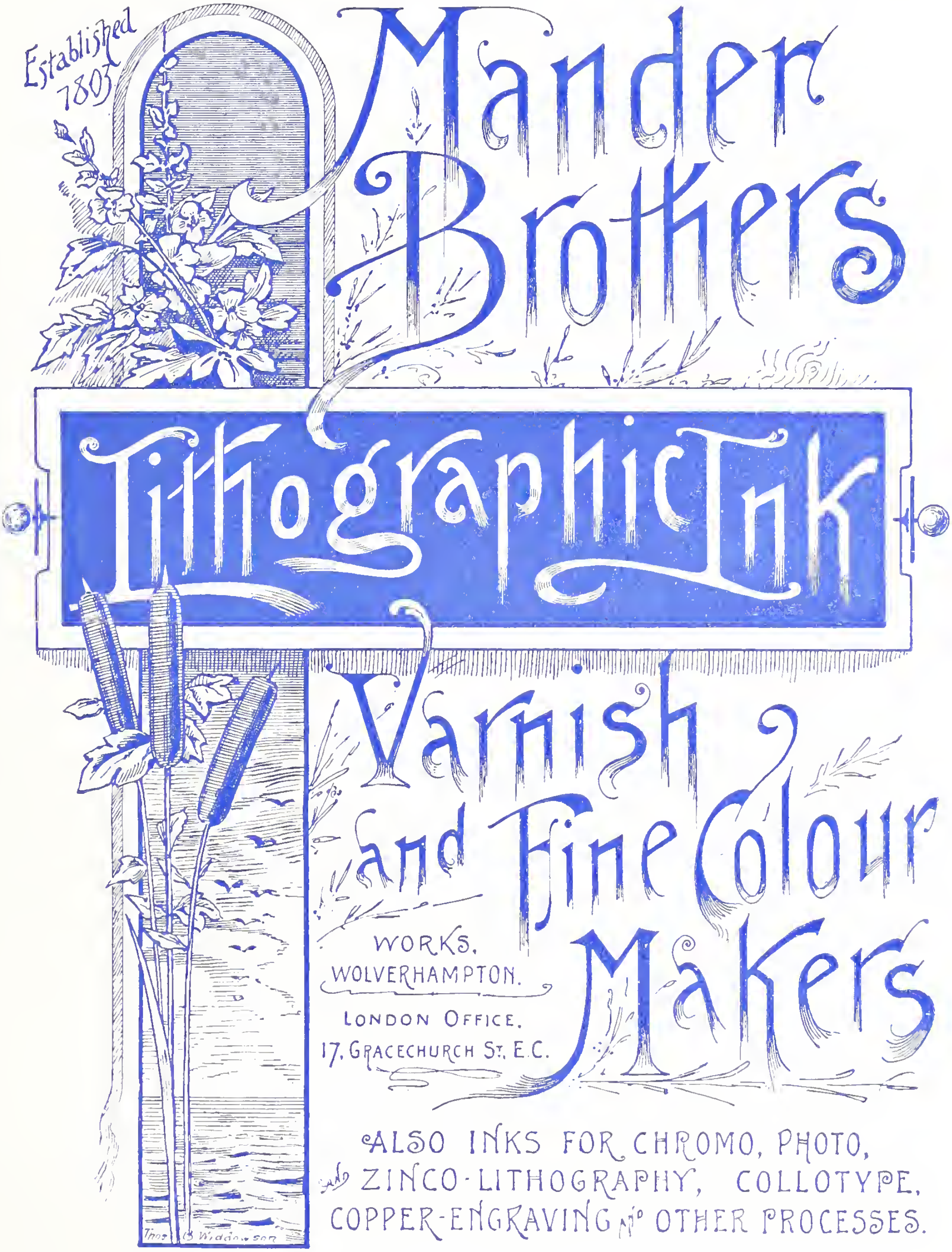
In all probability, lithography is only one of a series of such processes. It is within the bounds of reason to suppose that another series of substances may yet be found which will give the same results as lithography, the basis of which will be another set of chemical interactions altogether.

Returning to the stone, with which this treatise deals, it is instructive to notice, in every way, how it is affected by the materials used in lithography. Foremost of these are the acids, and of them, nitric acid is the most important.

Nitric Acid [HNO_3] when placed upon the stone, immediately commences to decompose it. What the products of decomposition are, considering the complex nature of the stone, it is difficult to state accurately; but there does not seem to be any doubt as to the formation of lime [calcium oxide, CaO], with carbon dioxide [carbonic acid gas, CO_2], water [H_2O] and probably either ammonia [NH_3], ammonium chloride [sal ammoniac NH_4Cl], nitrous acid [HNO_2], nitrogen monoxide [laughing gas, N_2O] or nitric oxide [NO]. Whichever of the latter it may be, the effect of its existence is but small, whilst if it is believed that the little-known compound—calcium nitrate [$Ca(NO_3)_2$]—of lime and nitric acid is found, then the ultimate effect from such a source is still further reduced, and it is unnecessary to look in this direction for the real action of HNO_3 upon the stone. It has been shewn that CO_2 gas is given off in bubbles, whilst lime—unslacked lime—is formed. Everyone is familiar with the action of throwing water on unslacked lime, and it is well known that organic matter is consumed by putting it into unslacked lime and adding water or leaving it to decompose. On a small scale it can be conjectured, that whilst the lime is being formed in presence of water, on a stone, that the organic materials of the ink are readily consumed or decomposed, and to prevent such a possibility it is necessary to cover the ink with a "resist," or body antagonistic to HNO_3. Any trace of gum upon a stone suffers the same decomposition, and scarcely any means of clearing gum from a stone can be so effective as to dust the work with a resist and wash with a weak solution of HNO_3. In the whole category of metals there is only pure gold available as an absolute resist, whilst the non-metallic bodies supply many such. Silica, sulphur, and fluorine are three useful resists, especially the compound of magnesium and silica, known as talc or French chalk. Amongst the organic materials there are useful resists to be found in bitumen, asphalt, and resin, but the degree of fineness to which these materials can be reduced is not so great as with talc or sulphur, and therefore does not fit them for fine work so well. It is a common error to use "bronze" as a resist. Bronze is copper-leaf, and the result of using HNO_3 with this metal is the formation of copper-nitrate, nitric oxide, and water, and it is not until there is an excess of HNO_3 on the stone that its etching action upon the stone itself can proceed, by which time the bronze has been decomposed and no longer forms a "resist," or protection to the work.

In the use of acids in lithography, much depends upon the final result, to insure their effectiveness. HNO_3, does not eat its way into the stone so far as to become a constant source of danger. Its action is superficial, and the result of its action is to form a powdery insoluble sediment, which is readily wiped and washed from the face of the stone, leaving no possibility of dangerous residue. Such characteristics fit it admirably for stonework.

Hydrochloric Acid [HCl] is the acid often known as "muriatic," and is the acid constituent of the plumber's "spirits of salts." It is useful in its way, and at first sight it would appear useful in lithography. It is not so powerful as HNO_3, but readily decomposes lithographic stone, forming carbon dioxide [CO_2], water [H_2O] and calcium chloride [$CaCl_2$]. The CO_2 gas escapes in bubbles, the water will not injure,



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whilst the $CaCl_2$ will crystallize upon the face of the stone. Certainly these crystals are soluble, and may be effectively removed by washing in hot or cold water, but the danger of them remaining is not worth the risk, and does not counterbalance the advantage of weakness which HCl possesses over HNO_3.

The presence of chlorine [Cl] must not be overlooked, for it is one of the most powerful destroyers of organic colouring matters.

Sulphuric Acid [H_2SO_4], or oil of vitriol, is a heavy powerful acid, which seems to soak into the substance of all things (glass included) with which it comes in contact. Its direct action upon "stone" is to release bubbles of CO_2 gas, form water and deposit a heavy, dusty, insoluble sediment. This latter is a desirable feature, but its other characters, including the very high temperature it rises to in the act of diluting with water, unfit it for stonework.

Acetic Acid [$C_2H_4O_2$], or the popular acid known as vinegar, has become quite a favourite with lithographic printers, although its properties do not guarantee what is expected of it. In its pure or diluted state, it attacks lithographic stone, forming readily an acetate of lime. This material has the very objectionable qualification of forming crystals—crystals which are soluble in hot or cold water—which are always liable to remain upon the stone's surface. Every artist is familiar with the curious manner in which his pen or brush works upon a surface of these crystals, and the same thing occurs in small degree according to the proportion of crystals left on the stone. The result is clear; when the printer begins to damp and roll up, the crystals are dissolved or forcibly removed and the artist's work appears in broken and ragged lines—often attributed to weak drawing ink. Further, the possibility of this crystallization is greater with acetic acid than any other. In winter, when printing rooms are not warm and the stones excessively cold, the mere act of putting acetic acid on a stone is enough to solidify it. It is an acid which at the comparatively high temperature of 17°C (62·6°F) becomes solid or "glacial." Acetic acid is used in another form, which is not always recognised by the printer. With the fungus or "mould" on jam, bread, and leather, most people are well acquainted. With the fungus which decomposes the sugar and forms the alcohol in beer brewing we are not so familiar, nor with a similar fungus, which will grow upon beer when left a few days. This fungus lives upon the sugar, extracting oxygen from the air and the liquid, and finally adds oxygen to the alcohol, gradually converting it into acetic acid—the cause of the souring of beer. It should not be inferred that sour beer can be used in the transferring operations instead of pure acetic acid; on the contrary, it is very good for keeping down scum on a stone, because of the presence of its other gummy constituents, which being on the stone prevent further spreading; but there its office ends.

Citric Acid [$C_6H_8O_7$], the acid derived from the juices of the fruits of the citron tribe, such as the citron, lemon, and orange, is usually sold in crystals. These crystals dissolve in cold water, but more readily in hot water, and a saturated solution is thus easily prepared. Citric acid is more powerful than acetic, and must be used proportionally more carefully. The old lithographic school used successfully the juice of a lemon squeezed out and diluted, such a mixture resembling in character the mixture of acetic acid in sour beer. The lemon juice is sufficiently strong, and may be taken as a gauge for the citric acid etching liquid. Pure lemon juice, however, is very acid to the tongue, and were it not for the starchy and sugary materials of the fruit, would be too strong for weak etching. In preparing etching solution from pure crystals for weak etching and cleaning stones, the acidity of the mixture should be a little stronger than to make it a palatable beverage. Citric acid, in its reaction, forms a citrate of lime, which is left as a fine insoluble dust upon the stone. This dust is washed off with plenty of water and a sponge. There is no possibility of this dust becoming dissolved and setting upon the face of the stone as is the case with acetic acid, thus avoiding the occurrence of broken work from that cause. Wherever cleanliness of work is the main object, citric acid is decidedly the best. When a stone is to receive new work, then citric acid solution should be used. When a grained stone has to receive new work, acetic acid would in all probability "set" in the grain, whilst citric acid, after making a clean "bite," can be effectually removed by plenty of water.

Oxalic Acid [$C_2H_2O_4$], derived from the decomposition of sawdust by caustic potash, from which calcium oxalate is precipitated and finally split up by sulphuric acid into calcium sulphate and oxalic acid. In rhubarb, calcium oxalate and potassium oxalate are found in crystals in the vegetable cells. It is a strong acid, which by heating decomposes into the poisonous carbon monoxide and formic acid. In its action upon stone it resembles citric acid, giving an insoluble powdery oxalate of lime, which is removed by plenty of water and a sponge. If citric acid did not exist, then oxalic acid would be a valuable substitute.

Leaving the materials used for destroying the surface of the stone, the attention is now directed to the other materials used in lithographic processes, which either protect the stone's surface or do not attack the stone at all, but have effect upon the other materials used. The first of these is gum, of which there are two well-marked varieties, viz., gum arabic and British gum.

Gum Arabic is an exudation from many foreign trees. The acacias of Arabia, India, and Tropical and Northern Africa all yield gum arabic. A similar gum is obtained from *acacia affinis* of Australia, *vachelia farnesiana* of India, and *terminalia belerica*. This gum has a somewhat complex structure, and may be set down as:—

70 per cent.	Arabin + water of crystallization.	
17 ,, ,,	... ...	Water.
13 ,, ,,	Potassium and calcium combined with the arabin as arabinates.	

It is in this composition that is found the value of the gum. The presence of the double compound of potassium and calcium with arabin is the protective feature. When ammonia gas is mixed with water, it becomes liquor ammonia and possesses all the properties of ammonia. If, however, the solution is heated, the ammonia gas is again given off and the

water remains unaltered. Now, in a difference of degree only, something similar takes place when pure gum arabic is applied to stone. The potassium and calcium compounds are partially broken up, whilst the arabin enters into combination with the calcium of the stone and practically forms gum arabic with the stone. When water is put upon the stone, the gum and the new combination are partially but not wholly removed. Everyone is familiar with the difficulty of getting gum clean out of a stone without polishing, the difficulty arising from the action above described. Even nitric acid does not alter this condition at once, for the acid is partially used in converting the gum into organic acids, which in turn combine with the stone and form a protective layer. A further wash of acid, however, destroys this second combination and effectually eradicates the gum. But, although gum arabic is so effective in its protection, yet it possesses internal disadvantages which must be counteracted to prevent injury to lithographic work. The arabin of the gum is an organic matter similar in composition to cane sugar, and having a formula of $C_{12}H_{22}O_{11}$. It is the pure soluble principle of the gum, and, as its composition indicates, is liable to much the same decompositions as sugar. It has already been pointed out that the sugar of beer is readily attacked by a fungus, which ultimately turns the beer sour. (See acetic acid ante). In gum similar actions take place, and after standing some time exposed to air a fungus causes the gum to go sour. This is a natural sequence, and can only be prevented by adding a few drops of carbolic acid to the gum when it is being made. This addition, in the proportion of 1 oz. to 800 ozs. of gum, is sufficient to prevent the growth of any fungus. There is, however, another source of danger, arising from the breaking up of the gum itself. The calcium and potassium do, in time, become disengaged from the arabin, and leave it to oxidise, becoming acid. The prevention of this lies in adding chalk to the gum when made, or even when it has become sour, providing such souring has not arisen from the fungoid growth—a condition which can only be determined by microscopic examination, or from knowing that carbolic acid was added when made. The extra chalk thus added should be sufficient to constantly keep the arabin saturated with calcium and retain the equilibrium of the mixture. Not only is gum liable to these changes in the mass, but when it has been spread upon the stone. When stones are put by, the thin film of gum goes sour unless carbolic acid has been added, and when the stone is required at a later date, much of the fine work—especially the tints on grained stones—is found to be partially destroyed. There is scarcely anything which can so effectually undermine the work as sour gum.

In using gum for gumming up, the stone should dry before putting on, and to successfully exclude air from the stone, the better plan is to gum a sheet of paper and place it on the stone, taking care to squeeze out all air bubbles in so doing. For gumming out a subject previous to splashing, tinting, or transferring, the addition of a little nitric acid is beneficial in one way, but often destroys the brush used for applying it. The nitric acid thus added decomposes the gum into mucic, saccharic, and oxalic acids, which in combination with the stone form an effectual barrier to the passage of greasy ink. Gum arabic is readily soluble in hot or cold water. It is not soluble in alcohol, but either alcohol or hydrochloric acid, when added, will precipitate the arabin.

The other variety of gum is British Gum, Gum Substitute, or Dextrine. This material is largely manufactured in a fine powder, for using on the back of all kinds of gummed tickets. Its composition shews a resemblance to arabin, being represented by $C_6H_{10}O_5$, which when doubled gives $C_{12}H_{20}O_{10}$, or a difference of only one molecule of water [H_2O]. But there the resemblance ends, for whilst dextrine is simply a sugary compound, the gum arabic is made complex with the calcium and potassium. This dextrine is prepared by heating starch to 150°C (302°F). It is soluble in water, but not in alcohol. It is far more liable to the decompositions which break up arabin than arabin itself, owing to its simple sugary character. The mere exposure to air of dextrine solution causes it to oxidize and acidify, and the addition of carbolic acid and chalk cannot possibly prevent it. Such a substance is wholly unfitted for gumming lithographic stone, and its use can only result in serious damage to every class of work.

When the gum arabic and dextrine solutions are well prepared, there is very little to distinguish them, and they may be readily used in error. There is, however, a means of testing the solutions, available in most printing rooms. By adding oxalic acid to gum arabic, the acid unites with the calcium and precipitates the powdery oxalate of lime. By adding the same acid to British gum, there is no precipitate, owing to the absence of any material with which the acid can combine.

In order that there should not be any misunderstanding, a digression is here made to shew the properties of the carbolic acid mentioned in connection with gum.

Carbolic Acid, Phenol, Phenyl Alcohol, Phenic Acid, or Coal-Tar Creosote [$C_6H_5(OH)$] is formed in the coal-tar oil in the dry distillation of coal. Benzine is also obtained from the coal-tar oil; benzine being the main constituent of the coal-tar naptha used for burning in lamps.

Carbolic acid is a white crystalline substance which readily takes up moisture and becomes a solution. In its pure condition it has a penetrating odour, and in its action it is also very penetrating. To taste, it has the sense of burning, whilst wherever it touches the skin it whitens it. Its peculiar properties are almost characteristic of this one substance. In boiling an egg the albumen sets or coagulates; carbolic acid when added to albumen has the same effect, and to this property may be attributed its power of extinguishing germ life, or any other existence. When therefore it is in gum solution, germ life cannot even begin, and the souring is thus prevented from that cause.

The penetrating effect of carbolic acid has its value in surgery and lithography. When it is added to an oil for external application, the oil is thinned and its

penetrating effect considerably increased. And when added to the oil of turpentine it has a similar effect by increasing the penetrating vigour of the turpentine. Turpentine with carbolic acid is most effectual in washing out work which resists most other means. There is little doubt that a similar addition to the oils used for rubbing up weak work would make them far more effective.

In the past, much misapprehension has arisen from this material being called an acid, leading to the belief that it will etch, and its addition to gum, etc., result in turning them sour. It is, however, not an acid in the ordinary sense at all. When hydrochloric acid (HCl) is applied to the skin it burns it; when caustic soda ($NaOH$) is applied to the skin in its strongest form it has a similar effect. No one would dare to put either of these in the mouth. But when these two substances are mixed, they combine and form sodium chloride ($NaCl$) or common table-salt, which is partaken with considerable relish. It has almost lost the qualities of the original constituents, and the resulting salt has very little more action upon the skin than carbolic acid has upon the stone. Chemically, a true salt is known as neutral in its action, and carbolic acid is also neutral in *its* action. It is, however, a disinfectant, a powerful antiseptic, which melts at 35°C (95°F), and boils at 184°C (363·2°F). It is used with lime for preserving eatables.

For lithographic purposes it should be always used in gum, in paste, and in the water used for damping the "damp book," to prevent them going mouldy.

After gum and acids, there is scarcely a material more universally used in all branches of lithography than turpentine, or some similar substance.

TURPENTINE [$C_{10}H_{16}$] is the oil of turpentine of commerce, and as purchased, is generally an unpurified mixture of different turpentines or essential oils. Pure turpentine is known as the rectified spirit, but it is not necessary to use this pure material for ordinary lithography. Turpentine is procured from the pine trees (*pinus nigra, abies,* and *sylvestris*, and the swamp pines of America); the variety known as Venice turpentine is from the larch. Amongst the essential oils, similar in many qualities to turpentine, may be included terebenthene (which is the chief constituent of the French oil of turpentine), terebene, thyme oil, and the oils of lemon, bergamot, neroli, cloves, lavender, pepper, camomile, and caraway.

These oils all dry by evaporation, and leave only a residue consisting mostly of a film of resin. Thus, when turpentine is mixed with water and distilled, a solid residue of resin remains. Terebenthene also when mixed with water forms at once a solid hydrate. Turpentine, when spread upon the stone, will also form a visible hydrate when water is dropped upon it, thus accounting for the streaky appearance when wiping off the turpentine from a stone.

Most fatty matters yield readily to the solvent powers of these evaporating oils, and therein lies the property which gives its value to turpentine and its varieties (or isomerides). Turpentine will act as a carrier or medium, in which an oil can be mixed and thus applied to work on stone. It is customary to make a mixture of equal parts of olive oil and turpentine to be used for refreshing the oily compound upon stone, when work has a worn-out appearance. Palm oil can be effectively used under similar circumstances. But the greasy matter which has the best results for such purpose is the pure fat of suet, known as stearine. This stearine can be prepared by melting suet and allowing the oil thus formed to fall on water. The separated fat solidifies on the water and is ready for use after drying it on blotting paper.

Not only is turpentine used as a medium for refreshing work, but for removing the secondary and dirty constituents of both lithographic writing and printing inks from the surface of the stone, previous to rolling up the work or using another ink. This process is attended with risks, which the use of turpentine alone increases rather than diminishes. Next to benzine [C_6H_6], which absolutely dissolves fats, and is skilfully used by artists for removing errors in their work from the stone, turpentine has a somewhat similar effect, but not so severe. Printers themselves are well aware of the strain upon the work by washing out too strongly or too often with turpentine, and it is advisable to use another of the varieties of turpentine which will accomplish the purpose without so much risk. However, if turpentine be preferred in this washing out process, the risk can be removed by the addition of a little olive oil or stearine, thus replenishing and strengthening weak work which might otherwise be partially destroyed. Instead of turpentine, the variety known as terebene has been successfully used for years in washing out; its redeeming feature being that whilst it cleanses almost as well as turpentine yet it is not so searching, and its somewhat greasy nature does not necessitate the addition of any further fatty matter.

The uses and value of turpentine cannot be underrated, although it is advisable not to use it when better materials are at hand. Turpentine for cleaning up the rollers and slab cannot be equalled, nor is anything so effectual in dissolving hard colours, such as prussian blue, previous to grinding. But wherever it is used, its rapid evaporation and the residue of resin should not be overlooked. Rollers which have been cleaned frequently with turpentine, get the greasy matter of the ink and of the fatty matter originally rubbed in in the breaking in, almost removed, leaving very small particles of resin in the pores of the skin and ultimately giving a hardened face to the rollers, thus destroying their use as nap rollers. Of course this is not a permanent destruction of the roller, and can be remedied as shewn in the chapter dealing with lithographic rollers. But it is an undesirable condition which is the consequence of too frequent use of turpentine. In all its other uses, such as the thinning of a preserving ink, or a photo-lithographic transfer ink, due time must be allowed for the entire evaporation to get rid of its effects in hardening the accompanying materials.

The fact of turpentine evaporating so readily gives it a further characteristic which may be taken advantage of in increasing the drying properties of an ink. But, again, turpentine is too energetic for the purpose, and its substitution by terebene, or some other variety of turpentine, is far more advantageous. This matter will be dealt with fully in the chapter upon bronzing and dusting.

In treating the subject of turpentine, the greasy material known as Palm Oil was mentioned. This substance is a pure vegetable oil obtained from some of the palm fruits of Guinea. It has the consistence of butter, and is known as palm butter, with an orange colour and a mellow sweet odour. Although not soluble in, yet it *mixes*, in any quantity almost, with ether or turpentine. The fact of it not being dissolved by the turpentine is the feature which causes its usefulness in lithography: for wherever the turpentine will penetrate it will carry particles of the grease with it, and wherever there is grease in the stone the palm oil will adhere, although turpentine is flowing all around it. Such breaking up of *mixtures* is as common as the decomposition of *compounds* by bringing two together.

Palm oil is largely used, and finds its way into the manufacture of soap, candles, and railway carriage grease; but it is also frequently adulterated with wax, lard, tallow, resin, etc.

Before dismissing this section of lithography upon the treatment of the stone, it is necessary to deal with two more matters. The first of these is the use of alum solution.

Alum $[Al_2 K_2 (SO_4)_2 + 24 H_2O]$ is a double sulphate of aluminium and potassium, which has long been used in lithography, and which is now coming prominently to the front in various ways. Its properties are certainly perplexing and it is difficult to find an acceptable explanation of its use on stone. One point alone gives a clue as to its probable usefulness, and that lies in it containing aluminium. It has recently been shewn that when alum solution is poured upon ordinary zinc, that the zinc becomes far more sensitive and can then be used in the most delicate transferring and printing. One of the patent German plates prepared during the past few years is, in the course of its manufacture, flooded with alum. And still more recently the Americans have proved, without doubt, that plates prepared with an exceedingly thin facing of aluminium are, to all intents and purposes, converted into the finest lithographic "stones." It seems that the aluminium from the alum solution becomes liberated and attaches itself to the stone, making it far more sensitive to grease. Thus far, experience has proved its utility; but turning to its natural characteristics it will be found to act generally as an acid and as a solvent of grease. Perhaps its acidity assists in cleaning the stone, by reducing the compound formed between the gum and the stone to a readily soluble matter, and the aluminium aids in increasing the sensibility of the surface. True it is, that if too much alum solution be used, the work upon the stone is dissolved and the grease spreads, resulting in thickened and filled-up work; so often is this the case that it cannot be recommended, unless the printer is prepared to use the solution in such a state that the taste of alum can scarcely be detected.

Alum solution has been found useful in renovating worn-out work; for which purpose it is rubbed into the stone similarly to ink, with which it may be mixed.

The second matter to be dealt with is the custom of allowing stones to lie ungummed. This practice has several evils. In large printing rooms, where machines are running rapidly, the air is filled with a spray of ink from the machines, and in but a short period a stone left ungummed is found to be irremediably spoiled by this spray settling on the whole surface. Again, where this evil is not present, another always is; for the air of most printing rooms becomes very hot during the last three or four hours each day. This heated air is capable of holding a large amount of watery vapour in suspension. This watery vapour will readily absorb and hold in solution the gases in the room. Whilst men are working and breathing, and gases are burning, the air is being heated, filled with watery vapour from their lungs and largely contaminated with the carbon dioxide of the breath, and from the combustion of the gas. Thus the air is filled with a watery solution of carbon dioxide. Just as the dew of the spring morning is found most thickly upon the coldest bodies, so it is in the printing room. The cold stones readily condense the water from the air, and their surfaces become covered with the watery solution of the dioxide. The carbon compound has a very powerful effect upon the stone. It is a common sight to see the mortar crumbling from between the bricks of our houses and necessitating a renewal of the pointing. This crumbling of the mortar arises from the presence of carbon dioxide and water in the air. That which is seen with the mortar is also going on upon the surface of every ungummed stone in a printing room; the carbon dioxide $[CO_2]$ is uniting with the lime to form the crumbling chalk, known as carbonate of lime $[CaCO_3]$. This latter substance has no hold upon the stone and must result in causing the surface of the stone to be eaten away in minute holes.

[*To be continued.*]

"Plant Form" Supplement, No. 2.

LILIUM TIGRINUM, OR TIGER LILY.

This splendid but "old fashioned" lily is an exceptionally glorious plant, by reason of its bright yellow flowers. It used to be a great favourite years ago, but is rarely seen in these days of æsthetic gardening. Being a late flower, it was very conspicuous amongst the floral show of early autumn. Its flowers are a deep orange yellow, getting darker towards the centre, and the stamens are a still deeper orange; the green of the leaves is a dark myrtle, and the plant generally grows to about three feet high.

Colourless Varnish.—Colourless varnish, for use on fine labels or other prints, as well as for whitewood and other spotless articles, is made as follows: Dissolve two and one-half ounces of bleached shellac in one pint of rectified alcohol; to this add five ounces of animal bone black, which should first be heated, and then boil the mixture for about five minutes. Filter a small quantity of this through filtering paper, and if not fully colourless, add more bone black and boil again. When this has been done, run the mixture through silk and through filtering paper. When cool it is ready for use. It should be applied with care and uniformity.

PLANT FORM.—NO. 2.

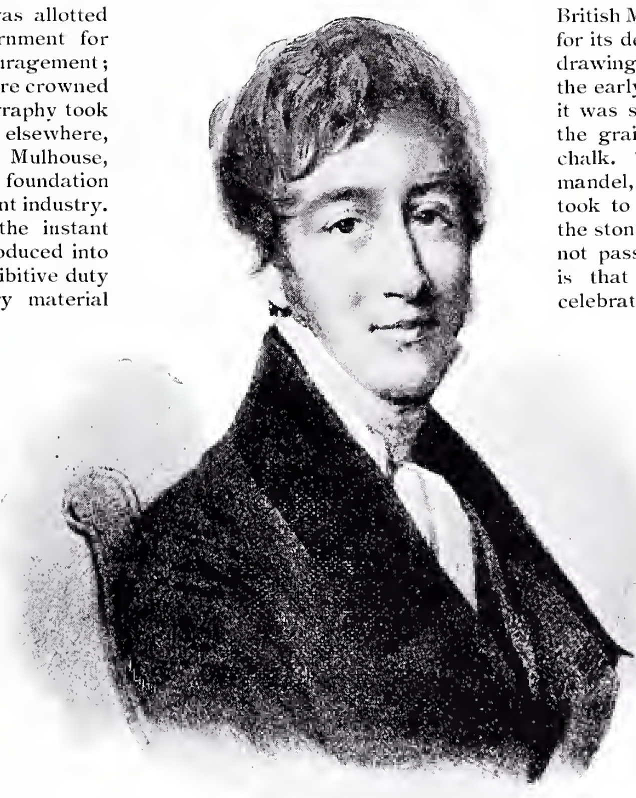
Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

The Rise and Progress of Lithography in Britain.

By Philip Butler Watt.

In continuing our history of the Art of Lithography in Britain, we may here compare the behaviour of the two Governments, France and Britain, at this period. When Lithography first appeared, the French Government sent two agents over to Germany to examine the merits of the new discovery, and to endeavour to introduce it into France. The art was found to be a useful one, and a considerable sum of money was allotted by the French Government for the purpose of its encouragement; the efforts for which were crowned with success, as lithography took firm root in Paris and elsewhere, but more particularly Mulhouse, thus early laying the foundation of a useful and important industry. On the other hand, the instant the infant art was introduced into Britain an almost prohibitive duty was laid on the very material without which there could be no lithography, viz., on the importation of lithographic stones into the country. It was alleged, as an excuse, that such was done to favour the use of the blue lias stone found at Bath and some of the southern counties, but this was all a mistake, as it had been tested and tried, and found useless for the purpose of lithography, at least in comparison with the Solenhofen stone of Germany. After the Government had enforced this duty for several years it was at last repealed at the urgent request of some of the practitioners, amongst whom was Hullmandel, who laboured incessantly to this end.

Up to 1810, however, lithography continued to struggle on, though only practised more as a sort of dilettante art than otherwise, and by some amateur artists of the day—excluding, of course, those celebrated names of artists we have already alluded to in previous notes, and others we should now name who either used it as a profession or encouraged it by their skill, and who did not consider it beneath their dignity to do so. To these may be added such names as A. E. Chalon, R.A., R. Westall, R.A., J. Reinegal, A., J. Collins, R.A., T. A. Baker, George Cattermole, R.A., Richard Corbould, R.A., T. S. Cooper, R.A., some of whom are entitled to more than a passing notice, and we begin with A. E. Chalon, R.A., who executed some very fine chalk work on the stone, and one in particular, a small drawing about 10 in. × 15 in., the subject being "Physchè conveyed from the rock by Zephyrs." This is to be seen in the print room, British Museum, and is remarkable for its delicate treatment and fine drawing, and is evidently one of the early chalk drawings of which it was said you could not touch the grained stone twice with the chalk. This was printed by Hullmandel, and shews what skill he took to preserve the drawing on the stone. Another name we cannot pass without special mention is that of T. S. Cooper, the celebrated animal painter, who at this period, 1822, began to practice lithography, and produced several drawing books, studies of animals, sheep and horses, etc., which were published by Rowney, and printed by Hullmandel.



G. Engelman.
(After Lemercier.)

In the year 1826, M. Engelman—who was considered to be one of the first lithographers in France, and whose work on lithography was, after Senefelder's, the standard book of its time—opened a place in London in opposition to Hullmandel, under the name of Engelman, Graff & Coindet, and they were supposed to have brought with them all the most improved processes, for lithography was then considered to be the art not only for portraiture, but for all the various kinds of illustrations. It began to affect wood engraving, steel plate engraving, and all other engraving processes; of course, the art of photography was not known, or if known, was in its infancy. This celebrated firm did much to establish the art in England. It is to M. Engelman that we owe the

practical realisation, noted by Senefelder, of printing in colours. They were the first to print in any number of colours, and M. Engelman took out a patent for printing in 1839, and gave to it the name of "Chromo-Lithography," but it is doubtful if he was the sole inventor of litho. colour printing, for a Mr. Hildebrandt of Berlin, during the years of 1832-3, perfected a mode of lithographing in colours, and produced several works printed in colour by a lithographic process, notably a collection of armories of the different German States, printed in as many as six, twelve, and thirteen colours. This, however, may have been a different process from Engelman's, but that chromo-lithography was produced before 1837, is, I think, most certain, though this does not affect the fact that it was first attempted and succeeded in Messrs. Engelman's establishment. Some of the works of the firm of Engelman & Co. were published by Messrs. Dickenson of Bond-street, and Rowney & Son. They printed some of the plates of Baron Taylor's large work of voyages, "Pittoresque et Romantic en France," and they did a few plates for Owen Jones' Alhambra; some are in the British Museum under artists' names, and notably some views in France. This firm brought over to their assistance the founder of the Hanhart's establishment, the late Mr. Michael Hanhart.

About this time may be mentioned the name of Delamotte, who took up lithography and worked a good deal on zinc, both with the pen and with the brush. It will be noticed that thus early, 1840, zinc was beginning to be used as a substitute for the lithographic stone. Delamotte was a teacher of drawing at the Royal Military College at Bagshot. He executed some fine studies of shrubs and trees, but his best lithographic work was his illustrations to "Mexican Antiquities," a work in nine volumes, which was printed and published by Hullmandel & Walton.

We come now to one who made lithography his profession—though he was a trained engraver—we refer to Richard Lane, A.E. He was the son of the prebendary of Hereford Cathedral, and his mother was the niece of the artist Gainsborough, so that he had, we may say, something of artistic blood in his veins. He was born about the year 1800, and when sixteen years of age was apprenticed to Heath, the engraver, and made considerable progress in the art, though he abandoned it in 1820 for the new art of lithography, to which he devoted himself and soon attained great excellency in it, obtaining the reputation of being one of the first lithographic draughtsmen either in Britain or abroad. The first work he produced, and which brought him into notice, was that of his copies in lithography of the sketches by Gainsborough produced in 1823, and which gave every touch and feature of Gainsborough's skill. After that he lithographed some sketches and portraits of Sir Thomas Lawrence, R.A. He also executed for the Queen (who appointed him her lithographer, the first using the name) several portraits of the Royal family after the celebrated artist Winterhalter, as also some other portraits of her intimate friends, and also produced some copies after sketches by his friend Challon, R.A., one of which was the choice little piece entitled "The Rivals," so much admired at the time for its fine detail; this latter was also printed by Hullmandel.

Joseph Nash, born 1808, may also be mentioned as an artist lithographer and a pioneer in the art, as he was largely employed by publishers in sketching subjects, principally views, for their various publications, though he also put on stone the whole of Sir David Wilkie's Oriental sketches, etc.

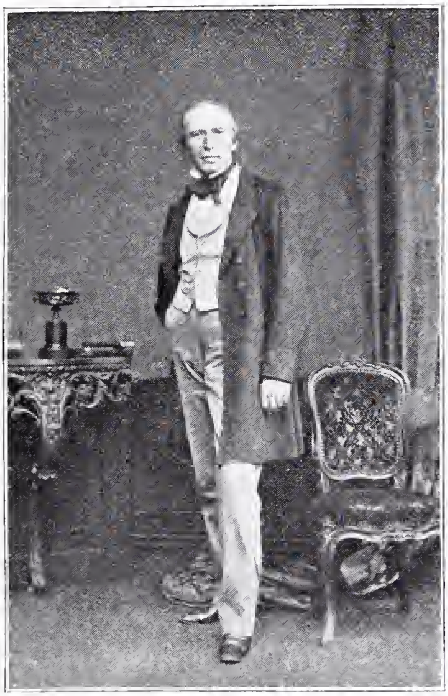
Thomas Allom, born 1804, may be put in the same category. He was originally an architectural draughtsman, but took up sepia drawing, and afterwards lithography; though his works are very limited in this direction, what he did do was very fine.

We now come to J. D. Harding, who was quite a luminary as a lithographic draughtsman. Born about 1798, he was the son of a drawing master at Deptford, being taught water colours by his father, and also received some instructions in colour from Prout, the water colour artist. He afterwards became articled to an engraver of the name of Pye, but engraving proving distasteful to him, he gave it up at the end of a year and settled down as a water colour artist, and was a regular contributor to all the water colour exhibitions. He was also from an early age a successful and popular teacher of drawing. When lithography came into vogue in this country he quickly adopted it as a means of providing good examples for the use of pupils and students, and in the many works he published greatly developed the resources of the art. He received two gold medals from the French Fine Art Academy for lithographic drawings exhibited at the Louvre in Paris. His early productions were drawing books consisting of studies of sketches, trees, etc., published by Rowney & Son. His "Sketches at Home and Abroad," a series of fifty plates done in tints, and published in 1834, excited general admiration, and King Louis Philippe, to whom the work was dedicated, sent the artist a breakfast service of Sévres china and a diamond ring. In 1839 he published his best work, "The Park and the Forest," a set of beautiful sketches drawn on stone with the brush instead of the crayon, and printed in tint, a plan it is said he himself devised, and to which he gave the name of "lithotint," but this was, most probably, merely an adoption of Hullmandel's mode of etching the stone. Amongst his many other lithographic works were a series of subjects from the works of R. P. Bonnington, 1829, and "Recollections of India, from drawings by Hon. C. S. Hardinge," 1847. He was also a prolific writer of educational manuals. His lessons on art, including the use of the chalk and lead pencil, and the principles and practice of art, in all of which he expounded his theories with great ability, became the approved text-books both at home and abroad.

As a feature in early lithography it may not be out of place to mention here some of the humbler pioneers who may have some claim to our passing notice. One of such was Robert Martin, a teacher of writing, who resided in High Holborn, and latterly practised lithography. He was a penman of no mean order, and his title page letterings were considered at the time very wonderful for pen work. It is said that he either sketched or wrote in lithography some of the title pages to Owen Jones' Alhambra. At all events we may consider him to be the first of the branch called lithographic writers. Another noteworthy pioneer was

one Thomas Baker, an engraver, but who took kindly, as it were, to the art and practice of lithography. Some of his pen work are marvels of patience and delicate touch, which no doubt his engraving hand had taught him, one pen drawing in particular, a sketch of a lithographic studio with a lot of stones grouped together having subjects on them. This he manipulated in such a wonderful manner, that it was taken for a fine etching, the size of it being only 4to demy.

Next in order comes one whose name is an honoured one in lithography, Louis Haghe. Strictly speaking, we may not claim him as a British lithographer, but being naturalized here, and coming here at an early age, and his works being so well known, we have no hesitation in including him amongst our most prominent lithographers who did much to popularize the



LOUIS HAGHE.

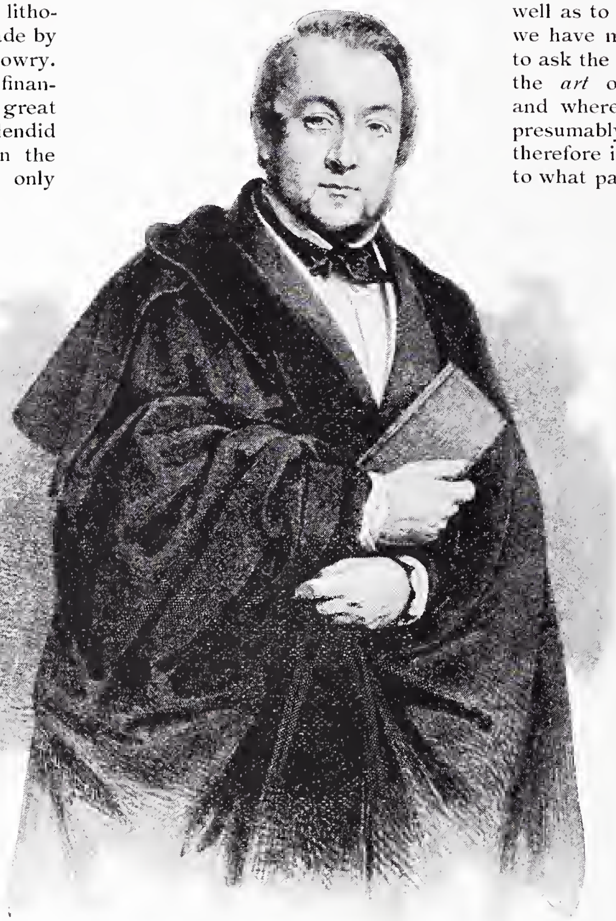
art amongst us. Louis Haghe was born at Tournay in Belgium. His father was an architect, and intended his son for the same profession. Having taken some lessons in landscape painting from a French refugee, De la Barrieré, he became enamoured of the new art of lithography, which De la Barrieré had introduced into Belgium, and became an apt pupil of his. About this time a young Englishman named Maxwell went over to Tournay for the purpose of studying the art of lithography under De la Barrieré, and pursuaded Haghe to come to London, which he did in 1823, and never quitted it as a permanent residence. The work at first did not come as it was promised him, and he was about to return to Belgium as there seemed little chance of getting regular employment. He offered his services to Hullmandel at the munificent salary of 30/- per week, which was not accepted. His appearance at that time might not have been in his favour, as he was a tall, raw-boned Belgian in a blue blouse, and by no means looked "artistic," at least from Hullmandel's point of view, and this might have influenced his decision. It appears, however, he next tried William Day, the founder of the celebrated firm of Day & Sons, who was at this time forming a lithographic establishment in Gate-street, Lincoln's-inn, and at once secured the young Belgian artist, whose great artistic talent undoubtedly created the name and reputation which the firm enjoyed. This connection was continued till the death of Mr. Day in 1845. During this connection many most valuable and beautiful productions were from time to time brought before the public. Some of these are views of Spanish scenery, Mullar's "Age of Francis I.," Lord Monson's views in the Valley of the Isere, his own sketches in Belgium and Germany, Atkinson's sketches of Afghanistan, and lastly, though in point of rank it should stand at the head of the art, David Roberts' magnificent work of "The Holy Land," a work which every lithographer *ought* to see and *study*. At the completion of "The Holy Land" he reproduced in chromolithography the large picture of David Roberts', "The Destruction of Jerusalem under Titus." This was one of his last and greatest works in lithography, and it is said he received one thousand guineas for putting it on the stone; the size of the plate was $42\frac{1}{2} \times 27$. His *last* work on the stone was the drawings of "Santa Sofia at Constantinople." He ceased his lithographic labours in 1852, and took entirely to water colour painting. Amongst his honours was that of the gold medal for lithographic work at the exhibition in Paris, 1847; he was made a member of the Belgian Institute the same year, and received the order of Leopold shortly after. He is represented as a man of kindly and affectionate disposition and an indomitable worker, all being done with his left hand, the right hand being defective from birth, and to those of his art who applied to him for advice or instruction he never refused assistance. He died in London, 9th March, 1885.

Owen Jones, another great star in the lithographic world—who, besides being a celebrated architect and chromoist, practised and did much for the art—was born in London about 1809, of Welsh descent, and was originally intended for the church, but became a pupil of the celebrated architect Vullimay, and studied at the Royal Academy. He travelled much on the Continent of Europe, and also in the East, and in 1829, with a friend, visited Granada, in Spain, where they were attracted by the glories of the Alhambra, which they intended to sketch. His friend, Mons. Gowry, died of fever during the visit, and the work was continued by Jones. Two years later he visited the Alhambra again and finished the work, and dedicated it to the memory of his late friend. For the purpose of producing this work he established a lithographic studio and workshop at his own home, laid in presses and stones, and employed artists and printers on the premises. M. C. J. Culliford, of Fullwood House, Gray's-inn, was one of his artists, and was three years

employed on the Alhambra drawings, and this gentleman has supplied some valuable information about him. Owen Jones was a peculiar man in his way, and had also some peculiar modes of working. When preparing his drawings for his great work, he used to squat down on the floor of the studio cross-legged like a Turk, with his drawing pad in his lap, and his colour pots on the floor beside him, and thus he would proceed to work. This work of his was entitled "The Plans and Elevations of the Alhambra, by G. Gowry and Owen Jones," it consisted of 101 splendidly coloured plates in lithography, all the drawings made by himself, the elevations by Gowry. The work, however, was financially a failure, owing to its great cost in production. A splendid copy of it is to be seen in the British Museum. It was only issued to subscribers at the moderate sum of 150 guineas. Some of his other works were Mosaic Pavements in Italy, Examples of Chinese Art, Polychromatic Studies, Grammar of Ornament, etc.

We cannot pass by another lithographic artist—who, though a foreigner, was a resident amongst us —J. Baugniet, and his works, which are mostly portraits of the celebrated men of his day, including poets, painters, politicians, musicians, dramatists, etc., shew that he was an artist of no mean capacity. The whole of this series may be seen in the print room of the British Museum. He was the first, and so far as can be ascertained, the only portrait artist who executed portraits *direct* on the stone, making use of the camera for the purpose of getting his subject in shadow or outline on the stone, and thus proceeding to work from the sitter. He was a very rapid and voluminous workman; he is said to have executed no less than 450 portraits in this way, most of which were printed by M. & N. Hanhart.

We must not forget a young lithographic artist of great promise, who was born in 1815, and died at the early age of thirty. Andrew Picken was a pupil of Louis Haghe, and distinguished himself in landscape and other illustrations, but being in delicate health from the rupture of a blood vessel in 1837, was sent by his physician to Madeira, which he visited twice, and made a series of sketches which were published under the title of "Madeira Illustrated," a work of great merit and skill. He returned to London and shortly afterwards died.



OWEN JONES.
(By Baugniet.)

We have thus far spoken much about lithography from an artistic point of view, that we think it necessary to take notice of it in another form and capacity. It has often occurred to us as well as to many others to whom we have mentioned the subject, to ask the question: Where does the *art* of lithography begin, and where does it end? It is presumably called an art, and therefore it is presumable to ask to what part of it does the name apply, if so—to that which is termed printing, which is the manipulation on the stone, or lithography in its more comprehensive sense. It is a matter of opinion, and we are inclined to say the art is with the manipulator or printer, as well as the artist, but will not here discuss the point, suffice it to say, Senefelder, the inventor, was no draughtsman, as he often said, but a lithographer, therefore, in the same spirit, let us pay some attention to one who, like Senefelder, was no draughtsman, yet did much for the art of lithography. Such a one was Michael Hanhart, the founder of the house of M. & N. Hanhart, and who may be considered the legitimate descendants of Engelman, Graff, and Coindet.

When Mons. Engelman decided to open an establishment in London, he sent over a practical head with Messrs. Graff and Coindet, who had been thoroughly trained under his own eye at Mulhouse, and practical in every sense. This was Mr. Michael Hanhart. Mons. Engelman himself never came to London, although often asked to do so by Mr. Hanhart. There came over also, from the head-quarters, two workmen, and the business prospered for several years, producing

some of the fine work still connected with Engelman's name, notably several of the plates in Baron Taylor's Voyages Pittoresque (a magnificent work), and also some of the plates of the Alhambra. Eventually, however, the firm of Engelman, Graff & Coindet split up, but M. Hanhart still retained the stones and presses and continued the business, removing it to Charlotte-street, where he established it under the name of M. and N. Hanhart, having taken his two sons into partnership, now being known as the firm of M. and N. Hanhart. But it should be explained how lithography is indebted to the founder of the firm, Michael Hanhart, who was undoubtedly a man of considerable energy and ability. The works he helped to produce in his time are evidence of his skill in this respect, and also of the advances the art was making under him. He was an improver, and was always improving his art, and it is undoubtedly to him, more than to Engelman, that we are indebted for the introduction and perfection of the art of chromo-lithography in this country, although patented as we have said in this country by Engelman. It was the practical study and experiments of Hanhart that brought it to the perfection it obtained, being very little improved since his day, and it is more than probable that some of the early specimens of chromo-lithography are not to be excelled by any present-day productions.

[*To be continued.*]

New Process for Graining Papers.

Carl Schaeuffelen, of Heilbronn, has patented in England a new granulated paper which the inventor claims will meet the most artistic requirements. In his specification he says :

The granulated papers hitherto produced have nearly always an irregular grain which has the shape of a greatly blunted pyramid of irregular base or an undulating shape. The paper produced by this process differs from these essentially by its grain having a perfectly pyramidal shape, and these pyramids, the bases of which may have any shape, but preferably that of a regular polygon or of a circle, lying at precisely equal distances from each other. According to the size of the grain one square centimetre comprises about 1,000, 1,500, 2,000, 2,500, &c., grains. To produce this pyramidal grain one of the two calender rollers, through which the non-granulated paper has to pass, viz., the steel cylinder, is provided on its mantle surface with pyramidal cavities corresponding to the size of the grain, into which cavities the paper is pressed by the other cylinder, which is commonly made of paper, the grain being thereby produced.

Instead of providing the pyramidal cavities on the steel cylinder of the calender proper, an even plate of steel or other suitable metal may be provided therewith on one side ; the paper is then laid on this side and together therewith pressed through the two smooth calender cylinders. The advantage of a paper thus granulated, especially for drawing purposes, consists in the drawing proper taking place only on the tops of the pyramids, so that the finest shadings can be made, the tops of the pyramids being more or less strongly flattened by the more or less powerful pressure with the drawing pencil, *i. e.*, the lines becoming thicker or thinner, while at the same time the valley lying between the pyramids appears widened or narrowed ; that is to say, a broader or narrower light space intervenes between each two pyramids. The whole design therefore appears as a group of painted and more or less flattened pyramid tops projecting over the base surface of the paper and between which the bottoms of the valleys appear in the colour of the paper. It is evident that, if lithographic crayon or indian ink is used for drawing, a design thus projecting can be transferred direct as easily as a design made on stone and etched so that copies precisely similar in execution to the original can be obtained.

Metallochromy.

Metallochromy is a process of direct polychrome printing upon metallic surfaces recently presented by Mr. Josz, its inventor, to the Society of Encouragement of National Industry. Hitherto, all impressions upon metal have been obtained by the transfer of a freshly-printed sheet, or by the transfer of the impression upon a sheet of rubber to a sheet of metal. To this effect it is necessary to construct special lithographic presses in order to obtain an exact adjustment of the colours forming the subject. In order that the printing may be done directly from a hard surface—that is, the lithographic stone, upon another hard surface—the metal, it is necessary to be able to render the metallic surface elastic enough to take the ink that the stone carries, without impasting or destroying the details of the subject. In order to reach such a result, the process employed is as follows : Upon the metallic surface to be printed there is produced by the mechanical action of very fine sand a fine and close grain, which is diluted and cleaned by immersion in different alkaline solutions. This roughened and velvety surface takes a lithographic impression as well as paper and fabrics do. Immediately after the printing, the sheet of metal is submitted to a temperature of 50° in a special stove, the object of which is to cause the ink to enter the pores. The impression is, therefore, no longer superficial, but is printed in the metal itself, whose expansion and contraction it may follow without undergoing any alteration. The metallochromic prints, covered with two coats of varnish, applied hot and fixed in a stove, present the same characters of durability as faïence and enamel.—*La Nature*.

When in some primeval forest a sinewy savage stood, years ago, etching upon the inner bark of a tree rude pictures that told of the animals or birds he slew, the first steps were taken toward the making of a book.—*Inland Printer*.

Bronzing and Dusting—Old and New Methods.

A NOVEL EXPEDIENT.

MANY printers of considerable experience still labour under a very mistaken notion as to the ways and means of printing the pigment which is to receive a bronze or dust colour. What has been done in many cases, to save time when a proof is urgently needed, has become also a common practice—so much so that a printer will always declare that it is sufficient to simply put a bronze upon any ink which at the time may be upon the roller, because the bronze particles will obliterate the colour of the ink on which it is dusted. This is a pleasant delusion, and may suit very well for the proof as stated above; but for genuine bronzing, there needs to be considerably more care exercised if the finished print is to bear inspection and comparison with the high-class work of the day.

In order that it may be more clearly seen why such care is necessary, it will be well to state beforehand the conditions and difficulties against which the printer has to contend in this class of work.

To begin with, the various qualities of paper must be considered. There are (a) well-sized papers, (b) half-sized or printing papers, (c) unsized papers, (d) bright enamelled papers, (e) dull enamelled papers, (f) soft boards, and (g) hard boards. Tissue paper is occasionally used for bronzing upon, and will be treated in conjunction with the other unsized papers in section (c). There are, then, at least seven varieties of printing surfaces which come under the ordinary usage of most printers, not to name others which have at times to be dealt with.

Having thus briefly described the papers in use, the next point is to consider the object in view when printing for bronzing and dusting, and this may conveniently be divided into (1) the necessity of having the bronze or dust solid, (2) that the original lustre of the bronze or the colour of the dust shall not be lost, and (3) that whilst retaining the purity of the bronze or dust it shall not be deprived of its brilliance. It is well known that to print for solid bronzing the ink must be tempered to print solid in itself, but not by overloading the rollers with ink, such overloading would simply destroy the power of retaining the brilliance and purity of the dust or bronze. To preserve the "colour" of the bronze or dust, the printing pigment must be either devoid of colour or of such hue as to harmonise with the tone of the bronze or dust.

With all these considerations plainly before us, it now remains to point out how to best utilise the materials which are at the printer's disposal to accomplish the desired effects. None of our readers will be so exacting as to expect every possible contingency or individual case to be described, but the methods given will be found to cover nearly the whole field of lithography, and it will be left to those who do not find exactly what they require to mix the information here given with the peculiarities of the work they may have in hand, to find the necessary nature of the pigment to be used.

To commence with perhaps the easiest, and the first section (a) of the papers enumerated, viz., the well-sized papers—used for writing purposes, etc.—the bronzing ink may be simply compounded of medium varnish with gold size. Gold size is simply boiled oil into which one of the ochres has been well ground; and where a firm grinds its own colours, this bronzing ink can be prepared by putting burnt sienna and thick varnish through the grinding mill, keeping it very stiff, then in printing, reduce it with medium varnish. This ink, with its yellow cast, is only suitable for gold and copper bronzes, and will not do for silver bronze. Instead of grinding sienna into the thick varnish, a mixture of white (zinc for preference) and Chinese blue, in the proportion of 20 of the former to one of the latter, is ground in, and reduced with medium varnish for printing. If nickel or pure silver bronze be used, then the blue should be omitted. To make a citron bronze or copper bronze look as pure as possible, the ink should be prepared by grinding raw sienna and a lake—in small quantity only—in thick varnish, and reducing with medium as before. The foregoing inks apply only to metallic bronzes, and do not meet the case of dust colours, the use of which has almost gone out of date. Should it be necessary to use dust colours, however, then the ink should be prepared by grinding a small quantity of blue—Chinese or Oriental—with thick varnish, to be reduced with medium, for such dust colours as blue or green; and for dusting vermilion, a pink should take the place of the blue.

So far, the methods of procedure have referred only to one good class of paper, and the printing is comparatively easy. But on turning attention to the other varieties of paper, difficulties great and small crop up with each.

With many of the papers in section (b), much the same treatment is required as with papers in section (a), except that care must be taken to avoid thinning the ink too much; but, with many of the poorer class of printing papers, the quality is so low that unless special care is exercised, the paper is torn or its surface peeled off. Here, then, arise difficulties of everyday occurrence. In the first place, it is necessary to use an ink with sufficient thick varnish, or some other equally adhesive matter in it, to secure the bronze being held upon the surface. The thick varnish is the cause of the trouble, and it cannot be abandoned; so that some remedial measure must be taken to eliminate from the ink the tackiness which causes the flaws, but at the same time preserve its power of holding the bronze. To use medium varnish is to meet the difficulty half-way, for whilst it is less liable to tear the

paper or pull off the enamel from a poorly enamelled one, it has not sufficient power to hold the bronze, because it is so soon absorbed by the paper. Again, to attempt to thin the thick varnish by adding thin varnish is only increasing the difficulty, for although the two varnishes are "mixed," yet they do not become so thoroughly incorporated as to prevent the ultimate separation of them in printing. The thin varnish soaks into the paper, whilst the thick varnish still pulls and tears the enamel or the paper itself. It is, therefore, necessary to retain the quantity of thick varnish, and introduce something to soften the ink. Often has the printer softened the ink by mixing tallow, mineral candle, raw oil, or paraffin with it, and in certain cases this remedy has had the desired effect. But in bronzing, this is a mistake, for that which it is sought to obviate is aggravated. The tallow being a non-drying oil, keeps the ink fresh and moist, conditions entirely opposed to bronze printing. A non-drying oil is therefore a failure, and it must be amongst the volatile oils where the remedy can be found. The volatile oils and carbo-hydrates include terebene, oil of bergamot, oil of lavender, oil of cloves, oil of neroli, oil of caraway, etc., all or any of which will in the first place sufficiently soften the ink to prevent it tearing the paper, and in the second place will evaporate, and thereby readily dry the ink after the bronze has been applied. Not only do these remarks apply to common printing papers, but the same principles are applicable to papers and boards falling under sections (c) and (f)—care being taken not to thin or soften the ink too much, lest it is all absorbed before there is time to dust on the bronze or colour; but, in using these volatile oils, considerable discretion is necessary, and in order that a quantity of ink may not be spoiled, the oil should be added little by little, until the proper consistency is reached —a state which experience and careful watching can alone determine.

As regards the addition of a volatile "oil," be it terebene, oil of lavender, or oil of cloves, it must only be put into practice when absolutely necessary—as when the work mainly consists of broad delineation, and not when it is fine or close work, where the oil might cause a thickening and filling-in of such work on the stone. In the event of printing such fine work, it may be possible to do without the oil altogether, and meet the difficulty by slow machining. But, how seldom is a drawing composed only of fine work? As a rule, there is a good admixture of fine and coarse, and it remains for the printer to use an ink which combines the quality of the volatile oil for the broad work, with the necessary consistence to print the fine work without it filling-in. For this purpose there are, at least, two good and well-tried recipes, viz.:—I. Medium varnish, two parts; white wax, one part; Venice turpentine, one part. II. Medium varnish, two parts; yellow bees-wax, one part; Venice turpentine, two parts. Both of these require the addition of a little driers and colouring matter, the colouring matter being either burnt umber or burnt sienna ground stiff in thick varnish. These inks can be preserved for any length of time, so long as the driers and colouring matter are not mixed in.

Having now disposed of four of the varieties of paper enumerated in sections (a), (b), (c), and (f), it remains to consider the difficulties in connection with enamelled papers and boards and hard-faced boards. Of enamelled papers, there are the bright and dull kinds, both of which require special attention. The bright enamels have a hard well pressed surface, and, in bronze printing, almost resemble hard-faced boards. That being so, the manner of printing will also be much alike for both. The hardness of the face naturally prevents the absorption of the varnish, and if the bronze ink is only mixed with strong or thick varnish, the ink will dry upon the surface and the slightest touch will rub all the work off, when it is supposed to be dry. To obviate this difficulty, with which every printer is only too familiar, the printing ink should contain a small quantity of copal varnish or flour paste. Either of these substances will cause a ready and firm adherence of the thick varnish, bronze, and paper. The quantity of copal varnish will vary with the particular class of paper being dealt with. For the very bright enamel papers the quantity will be proportionately more than for the gloss paper, and the quantity will be less again for half-glazed papers. When, however, dull enamel paper is used, copal varnish may safely be omitted, and the ink entirely prepared with thick varnish. There are papers, however, which, though not enamelled, have been manufactured with a face as hard as board, such as the steel-blue and black papers. In dealing with these, the ink should be prepared with thick varnish only. What has already been stated in connection with poor printing papers applies equally to enamel papers, when the surface is not in a fit and proper condition. The ink will require to be tempered with a volatile oil, to prevent the enamelled surface being torn from the paper. An enamelled paper upon which the surface has been only sparely coated, and which shews the web of the paper through, is entirely unfit for bronzing upon. It is almost unnecessary in an article of this character to repeat that which is the common knowledge of all printers, yet, lest any one should rigidly follow the directions here given and under certain conditions should meet with failure, it is desirable to impress our readers with the fact that the strength of varnish is increased in cold weather and decreased in warm. Therefore, in winter it may be found that medium varnish will give satisfactory results, in place of the thick varnish, and in summer it may be found useful to add extra-strong varnish in some instances to strengthen the thick varnish.

Amongst the many time-saving expedients which are constantly being applied in all branches of industry, not the least interesting is an ingenious method of printing a series of colours in succession for show card and label work, and by the process entirely doing away with the necessity of a separate printing for bronze. At the present time gloss varnish is procurable, which has the effect of causing the pigment to dry quickly with a smooth surface, upon which bronze will not catch. By careful manipulation the use of this varnish may be made to serve two ends. Should it be necessary to have one or two bronzes in the finished print, they can be applied in the following

manner without separate bronze printings. In drawing the yellow stone, for example, the gold is also drawn on the same stone. Then the next colour—say flesh, or light green—is drawn and the gold is again added on the same. Now, in printing, the "yellow" is printed and allowed to thoroughly dry. When dry, the flesh or green is put on, and it will soon be seen that wherever the second printing falls on clear paper, it will dry in about five hours, and that where the second printing overlaps the first, it will be sufficiently adhesive to hold the bronze when dusted on. If a second bronze—say silver—is required, it can be done in the same way by overlapping two of the subsequent printings. Such a course as this will only be of service in the plainest styles of lithography, and could not possibly be applied when it is necessary to utilise the overlapping of colours to obtain secondary chromatic effects.

We have given this method for what it is worth, and it will only be appreciated as well as utilised by those who can see a permanent gain in the process. The saving in the cost of a printing may be often outweighed by the cost of drawing a bronze stone twice, or the cost of transfers and second off-sets, to save *drawing* the bronze twice.

Notwithstanding the improvements which have been introduced and dealt with in the foregoing remarks, it is impossible to conclude the subject without a reference to methods of old standing. Bronzing inks of a most adhesive character have been used in which Canada balsam and copal varnish form the principal constituents, whilst another consisting of one tablespoonful of stiff paste, the same amount of bookbinders' glue, and one pound of ink (colour to suit) mixed with medium varnish and driers added, has been compounded. These inks are sufficiently strong to adhere to the hardest materials, such as metals and glass, and are not admissible when the paper is at all liable to tear. A good old-fashioned bronzing ink, prepared with umber ground into thick varnish and reduced with medium varnish, will suit almost any class of gold printing, and, with the addition of copal varnish or paste, will meet the requirements for hard surfaces. By using umber, driers are not required; but in other cases, should driers be necessary, it is far more advantageous to use copal varnish than any patent driers, which generally form a hard coating upon the rollers.

Gum Adulteration.—Recently, genuine gum arabic has been put upon the market mixed with more or less worthless kinds of gum. According to A. Jaksch such an admixture, even only in the proportion of five per cent., can be detected by the following procedure. A quantity of the suspected gum is treated with ten times the volume of hot water, and allowed to stand for three or four hours with frequent stirring. After the insoluble constituents have settled, half of the liquid is poured off, replaced by an equal volume of cold water, and again well stirred. The procedure is twice repeated within an hour. The last mixture, after standing a short time, separates into two parts, of which the upper consists of water and the lower of a jelly-like, strongly refractive substance.

How to Photograph Stained Glass Windows, Oil Paintings, &c.

By S. B. Webber.

Orthochromatic photography is a subject of increasing interest, and a great aid to obtaining colour values. The following method will be found very efficient for copying oil paintings or interiors of churches with stained glass windows, without any sign of halation:

The Plate.—Select a plate with a hard film and not liable to frill. Also one that will stand ammonia without producing fog. Mawson & Swan's ordinary fulfils these conditions.

Stock Solution.	Erythrosine, 90 grains dissolved in pure alcohol, 6 ounces. Add Liq. Ammonia, 1 drachm.
Bath.	Stock Solution as above, 1 drachm. Liq. Amm., strong, 1 drachm. Distilled water......6 ounces.

Dyeing the Plate.—To dye the plate, pour the bath solution into a clean dish (glass preferably), then immerse the plate in sufficient dye to well cover it. Rock it gently for one minute (a little longer in cold weather), then rinse the plate in distilled water and set on edge to drain; finish drying in a dark cupboard or drying box.

N.B.—The dye or bath solution may be used over and over again.

Backing.—To prevent halation back the plates. A simple and efficient method is to paint them with umber moistened with glycerine, then india-rubber cloth is pressed upon the backing, to keep the dark slides clean.

The screen is best of *yellow* glass (optically flat) placed inside the lens tube close in front of the stop. Collodion stained with aurantia is good, or yellow will do. Exposure for oil paintings with medium stop about thirty minutes. By gaslight no yellow screen is required.

After exposure, remove the india-rubber cloth, and a damp cloth or sponge will easily take off the umber.

After long exposure a bath of bromide of potassium, one ounce in twenty of distilled water, is good for about fifteen seconds; drain the plate a little before development.

Development as usual, pyro and ammonia. Care must be exercised not to keep the plate unnecessarily exposed to the ruby light. Yellow is not safe.—*Anthony's Photographic Bulletin.*

A spirited discussion is going on in an American journal between the editor and correspondents, arising from the editor having written an article advising new apprentices to take up engraving rather than lithography, and, notwithstanding that the correspondents point out the number of advertisements for engravers, as well as the number constantly idle, yet the editor persists that genuine and reliable engravers are scarce, and that there are permanencies for good men.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

Collotype Printing by Machinery.

Automatic Frisket and Automatic Delivery.

The great advances made in collotype printing as a means of illustration have drawn the attention of machine makers to the improvement of the speed of production. One thing which has stood in the way of speedy machine printing is the necessity of interposing a mount (frisket, or mask) which shall come between the collotype plate and the paper, allowing as much of the print to appear on the paper as is necessary, and cut it off with a clean edge by this mount or mask. The interposition of a mask in the hand-press is easily accomplished, and in the first collotype machines was also easily obtained by feeding a frisket with each sheet; but a machine maker has recently invented a machine which not only interposes the frisket automatically, but also delivers the printed sheets by a fly delivery, similar to letterpress machines. The most successful efforts to improve lithographic machinery all seem to tend towards making lithographic machines more like letterpress ones.

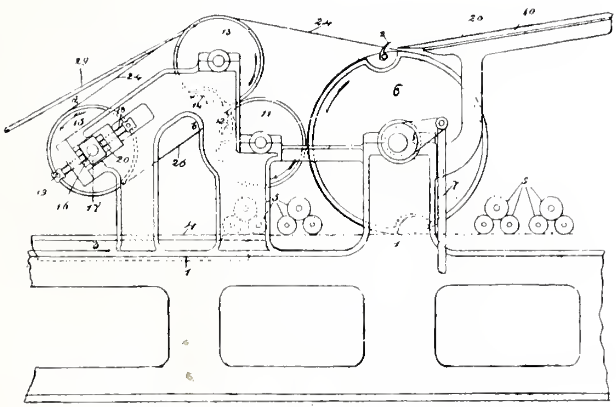


Fig. 1

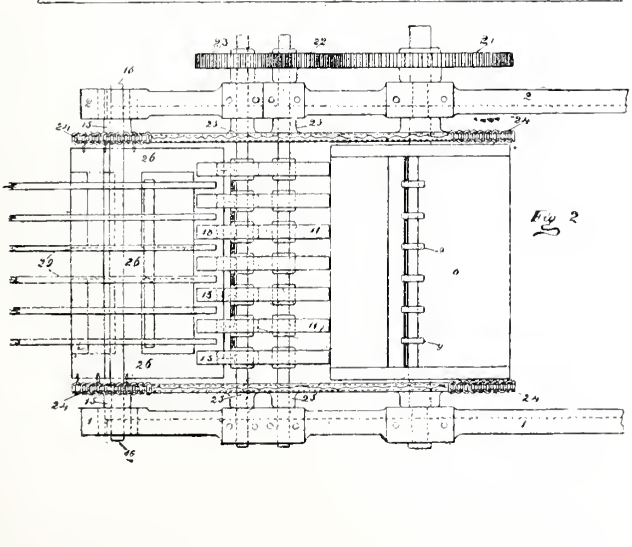


Fig. 2

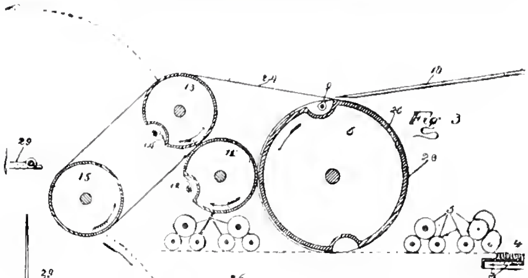


Fig. 3

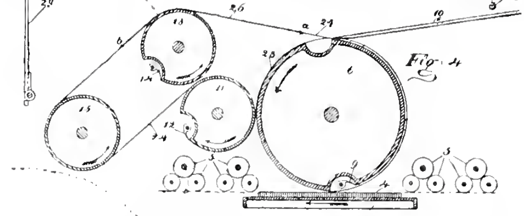


Fig. 4

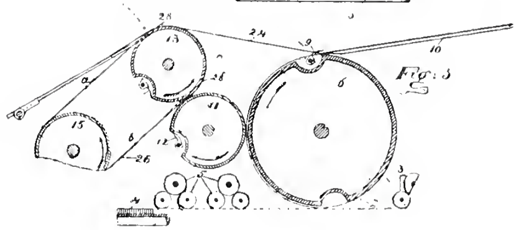


Fig. 5

The accompanying outline figures serve to illustrate the principle and the mechanism directly connected with the automatic frisket, without any attention being given to the other parts of the machine, with which most printers can readily make themselves familiar by inspecting any letterpress machine.

Figure I. shews, in side elevation, the feed board, 10; the impression cylinder, 6; the transfer cylinder, 11, which is half the diameter of the cylinder 6; the delivery cylinder, 13. These cylinders 11 and 13 can be replaced by a series of pulleys. Both cylinders are of the same diameter. These three cylinders carry sets of grippers at 9, 12, and 14, which serve to take the sheet from one to the other after printing and bring it to the fly, 29, for delivery. Cylinder 6 drives cylinders 11 and 13 by the toothed gearing shewn at 21, 22, and 23, fig. II. The movable bed is shewn at 3 and the printing plate at 4, the various positions of which during printing are fully shewn in figs. III., IV., and V.

The parts thus mentioned indicate only the automatic delivery, and it remains to shew the frisket mechanism. The cylinders 6, 11, and 13 are provided at the sides of the machine —as shewn in plan in fig. II., at 24, 25, and 25— with the necessary toothed (or sprocketted) edges, to carry endless chain gear. This chain gear is also carried forward around a special chain gear wheel at each side of the machine, as shewn at 15. This wheel can be adjusted so that the tension of the chain is always

correct. The frisket, which is not a very large affair—and varying with the size of sheet printed—is held across the machine by the chains at each side, and when in motion is constantly being carried under the cylinder 6, over the top of the machine, and back again. This motion is best understood by following the positions as shewn in the illustrations, fig. I., III., IV., and V. In fig. I., the frisket, 26, lies around the wheel 15, from the small letter *a* to the letter *b*; when set in motion, grippers 9 take the sheet and advance with it towards the under surface of cylinder 6 to meet the plate, 4, just as in a lithographic machine. But as the sheet advances, so does the frisket, and when grippers 9 reach the cylinder 11, the end of frisket 26*b* has reached the same point, and the sheet with the frisket over it travels under the cylinder, comes in contact with the printing plate and passes up the other side, as shewn at 26 and 28 (being the printed sheet) fig. III. On arriving at the gripping position under the feed board again, the frisket is at 26, as shewn from *a* to *b* in fig. IV. The grippers 9 do not release the sheet, but carry it forward to cylinder 11, whose grippers, 12, next take the sheet; cylinder 11 carries the sheet to the grippers, 14, of cylinder 13, which carries it forward to the fly delivery, 29. By this time the cylinder 6 has completed its second revolution and is ready for a new sheet from the feed-board, and all the other mechanism has assumed the position as shewn in fig. V., ready to go through the same course of operations.

The arrangement displays considerable ingenuity and must meet with great success, notwithstanding some disadvantages which it possesses. It is argued that the printer must be able to see and get at the printing surface, and this mechanism certainly prevents it. The substitution of pulleys for the cylinders 11 and 13 will allow of a lot of light being thrown on the subject, but the framework of the machine is necessarily so high on each side to carry the shafts, that it is quite impossible to get inside to the printing plate. It is not customary to attend to the printing surface on the inking side of the cylinder, but it is an advantage which is made considerable use of by most printers.

New Process of Printing Colours.—*La Typographie Française* mentions the discovery of a method of printing several colours at once, either by letterpress or lithography. The new process, it is claimed, decreases by nearly seven-eighths the number of workings usually required in a form of eight colours. It also effects considerable saving by avoiding the loss occasioned through want of precision in the workings, and considerably lessens the quantity of ink used by suppressing the numerous washings usually required.

The Vienna *Handelsblatt* describes the manner in which paper is made transparent for copying purposes in the government offices of Austria. A sheet of ordinary white paper, thin and tough, is placed over the drawing to be copied, and a sponge dipped in benzine is drawn lightly over it. This renders it perfectly transparent, the benzine on evaporating leaving the paper opaque as before. The benzine must be pure, or an odour may be left.

Little Hindrances to Good Work.

Nos Confrères, the new trade journal published at Brussels, gives a few practical, even though perhaps elementary hints on some of the little hindrances which are apt to occur in every establishment, however well regulated, and which are more annoying and vexatious from the fact that the workman cannot always discover the reason for such mishaps. It observes that there are many causes which tend to affect the clearness of a drawing, especially one containing very light lines, and sometimes go so far as to spoil it entirely. Some of the causes are:—a transfer left too short a time; a stone gummed with gum containing an acid; washing out with turpentine too frequently; too much damping; the use of a too strong black; using ink which has become too hard, or has hardened the face of the roller, etc. If the lines have been badly injured by the action of some acid or by a too vigorous rubbing, any effort to reproduce them will be in vain, for being once destroyed it is impossible to make them reappear on the surface of the stone. But if, on the other hand, other causes have tended to cause damage superficially, it is possible, by observing the following directions, to frequently restore the work to its pristine condition. If dampness has acted on the lines, the part affected should be carefully placed at a moderate distance from heat, the part being ungummed first, and when the moisture has disappeared, the part may be gummed and afterwards inked when thoroughly cool. Should this method prove unprofitable, use a piece of flannel well coated, and as dry as possible, with Marseilles soap, damp the stone very lightly indeed, and rub the parts affected with the flannel thus prepared. When this has been done, clean off, and use the roller very carefully, using a little tallow along with the black.

An Important Invention.

The following invention, not patented, says *The American Lithographer and Printer,* we make public for the benefit of our readers.

When an impression is made from any drawing upon transfer paper, and this impression is a solid one, it may be transferred to glass, zinc, stone, or any hard surface. This may be sent to the sand blasting works, and sand blasting done in the regular manner, with the result that the sand blast will act only on the exposed portions of the hard surface, and little or none at all where there is printing or transfer ink. Thus, for example, a crayon portrait, a view, or any kind of a design made upon glass, may be made to appear on a dull or *mat* back ground.

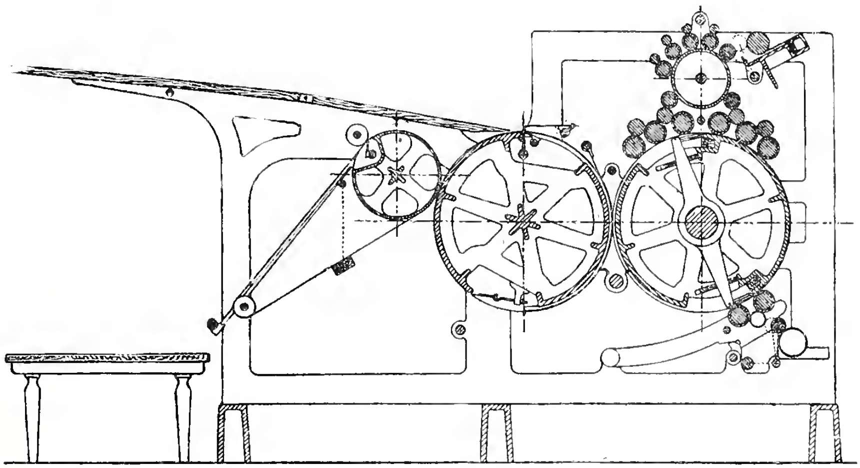
There may and undoubtedly will be found means to turn this invention to excellent and profitable account. Certain it is that extensive application may be made of the underlying principle. It stands to reason that a new style of printing plates may thus be obtained, the sand blast not taking action upon parts covered with the soft slippery ink, while affecting with energy the hard surfaces.

The First Step towards Rapid Lithographic Printing.

THE HUBER ROTARY ZINCOGRAPHIC PRESS.

For many years the makers of lithographic machines have been endeavouring to increase the speed of their machines, without jeopardizing rigidity in the framework. They have made the parts lighter in some instances, and heavier in others. One maker prefers to make the framework heavy, to allow of a greater speed in the movable parts—a principle which has certainly been attended by the best results. But whilst machine makers have been increasing the speed, they have not made any headway in reducing the space covered by the machine. With the introduction—or rather revival—of zinc plates, both plain and coated, a new era has opened, which is becoming more and more interesting from the variety of improvements that are coming with it. Economy of space, economy of time, and economy in first cost, are all well worth consideration, and it is each and all of these which are met by the novel Huber rotary zincographic press. This press will produce at least twice as many impressions as a lithographic machine, and the speed is still sufficiently slow for the feeder to do his work satisfactorily. A glance at the press itself, as illustrated in our longitudinal section, will reveal in how many ways the zincographic press has been brought up to the standard of typographic machines. Under the feeding board is a small cylinder for delivery, which takes the impressions from the impression cylinder; this, in turn, abuts against the cylinder which carries the zinc plate. The plate is readily fastened to or removed from this plate cylinder. In use, this plate cylinder can be thrown out of gear at once, for registering purposes, and to accomplish this, can be moved backwards or forwards and again put into gear, whilst adjusting guides on the feeding board effect the necessary alterations for register in a sideway direction. The plate is inked by the six inking-rollers running above, and damped by the damping mechanism in front and below. By a clutch and trip lever the inking can go on without damping or without being in contact with the impression cylinder; so that this press contains all the arrangements of modern lithographic presses. The inking-rollers receive their ink from the inking drum, upon the surface of which run five distributing rollers. This completes the description of this novel machine, except, that all the parts being interchangeable, repairs may be rapidly executed. On a further examination of the merits of this machine, it will be seen that it is light and small, and can be used where the floors are sufficiently strong to carry the weight of the machine itself,—some 3 or 4 tons—there being none of that heavy vibration characteristic of lithographic presses, and being 40 per cent. smaller, will allow more machinery on the same floor than the latter could possibly do.

Already this rotary machine has been put into some of the largest houses in America. The Forbes Lithographic Manufacturing Company has two; Providence Lithographic Company, two; Julius Rieu & Co., two; Trautman, Bailey & Blampey, one; Springer Lithographing Company, one; Stecher Lithographing Company, one; Courier Company, three; United States Printing Company, one; Enquirer Job Printing Company, one. Of these, there are two firms now printing from the Huber Rotary, who heretofore were exclusively typographic establishments.



PICTURES IN SULPHUR.—In demonstrating that sulphur melted at 115 degrees can be cooled in paper, Mons. Charles Lepierre happened to use a lithographed card, the edges of which were turned up. Upon taking away the card he discovered that the lithographed characters were clearly impressed upon the cooled surface of the sulphur, and remained after hard friction and washing. By repeated experiments he has been able to secure very fine results, removing the paper each time by a simple washing and rubbing process. He finds that sulphur will receive impressions from and reproduce faithfully characters or designs in ordinary graphite crayon, coloured crayons, writing ink, typographical inks, China ink—coloured or uncoloured—and others.

BROMIDE prints may be toned a sepia colour if, after development and before fixing, they are slightly bleached with a solution of bichloride of mercury. After washing, fix in a solution of hyposulphite of soda 1 ounce, water 6 ounces.

Blue Paper Printing.

Cyanotype, or Ferro-prussiate Paper.

AMONGST the many printing processes kindred to lithography, not the least interesting is that by which mechanical drawings are multiplied for the purposes of estimates. With "bills of quantities" and "specifications," having small sketches of special portions in the margin, all printers are only too familiar—perhaps more familiar than is always pleasant, especially when the uninitiated architect wants full copies of forty or fifty sheets, *next morning*. But, although so closely bordering on this method of publication, the lithographer is scarcely aware of the large number of prints produced for the same purpose by the blue paper method. Of such methods there are at least eight well marked and thoroughly practicable varieties, some of which produce the picture in white on a blue ground, others blue on a white ground, and others black on a white ground. Nearly all of these may, in one way or another, give substantial aid to the artist or printer, and we shall proceed to give in detail the manipulation for each separate process :—

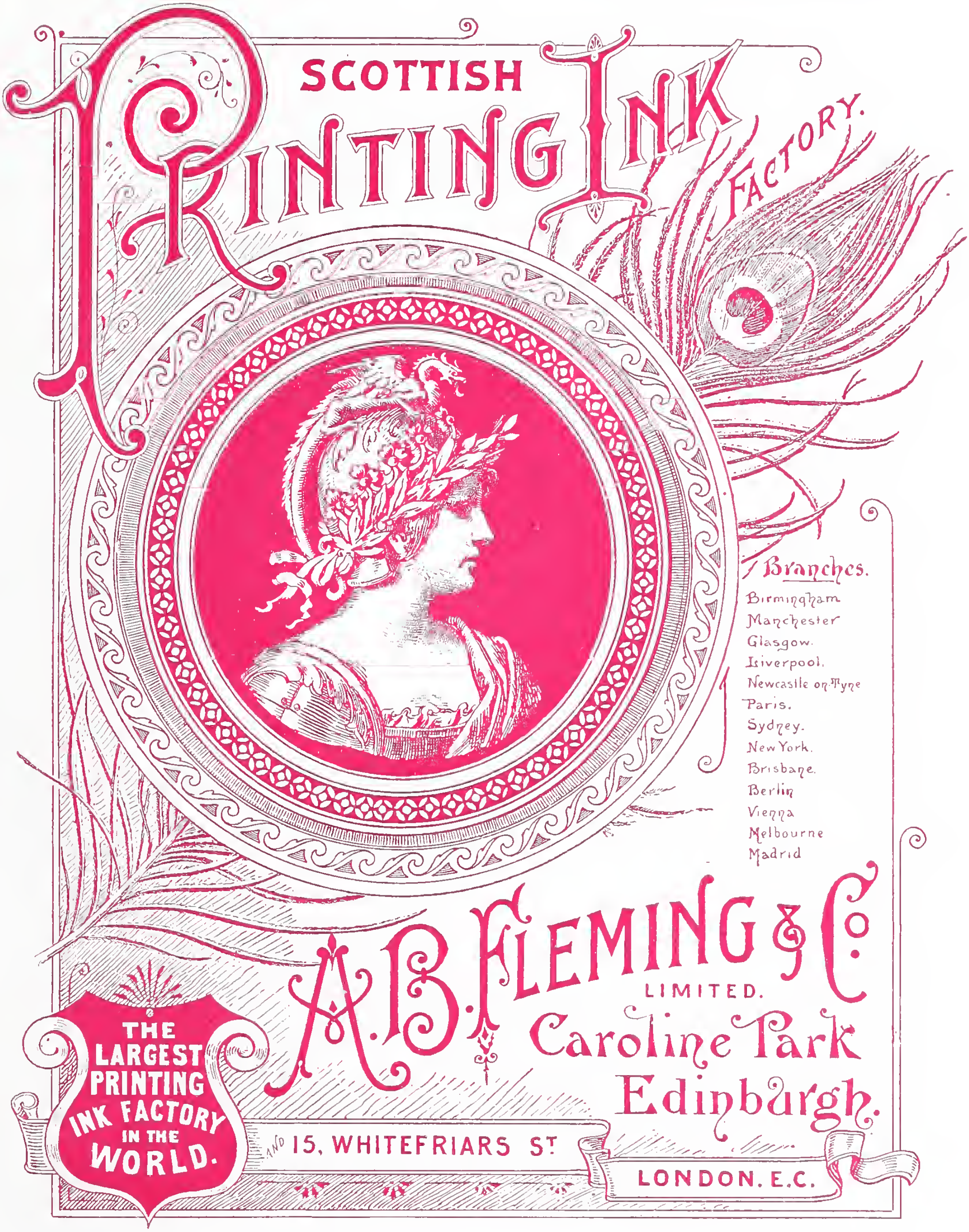
(1.) Cyanotype, or Ferro-prussiate Paper.—This is prepared by covering one side of the sheet with a mixture of red prussiate of potash (potassium ferrocyanide) and iron peroxide; under the influence of light, i. e. under the white portions of the drawing to be copied, the ferric compound is reduced to the state of a ferrous salt, which gives with the red prussiate of potash an intense blue coloration, analogous to Prussian blue. This coloration is not produced in the portions of the sensitive paper protected from the light by the black lines of the drawing to be copied, and on washing the print the design appears in white lines on a blue ground. The formula for preparing the sensitive paper is as follows :—

(*a*) Dissolve 10 drachms red prussiate of potash (ferrocyanide)
in 4 ounces water.
(*b*) Dissolve 15 drachms ammonio-citrate of iron
in 4 ounces water.

Filter separately through filter paper, and subsequently mix them. Filter again into a large flat dish, and float each sheet of paper to be sensitised for two minutes on the surface of the liquid, without allowing any of this to run over the back of the paper. Hang up the sheets in a dark place to dry, and keep from light and damp until used. They will retain sensitiveness for a long time. The paper being ready, the copy is easily made. Procure either a heavy sheet of plate glass, or a photographer's printing frame, and lay the drawing to be copied with the face against the glass; on the back of the drawing, lay the prepared side of the sensitive paper, place upon it a piece of thick felt, and replace the cover of the printing frame, or in some other way press the felt and papers firmly against the glass. Expose, glass side up, to sunshine or diffused daylight, for a period varying with the intensity of the light and the thickness of the paper bearing the original drawing, from minutes to hours. It is better to give too much rather than too little exposure, as the colour of a dark impression can be reduced by long washing, while a feeble print is irremediably spoiled. By leaving a bit of the sensitive paper projecting under a piece of the paper on which the original is drawn from under the glass, the process of the coloration can be observed. When the exposure has continued long enough, the frame is opened and the sensitive sheet is withdrawn and thrown into a pan of water, to be replaced immediately by another, if several copies are desired, so that the exposure of the second may be in progress while the first is being washed and fixed. The water dissolves out the excess of the reagents used in the preparation of the paper, and after several washings with fresh water the print loses its sensitivenes, and becomes permanent. It is advantageous, after several washings with water, to pass over the wet surface a weak solution of chlorine or of hydrochloric acid, 3 or 4 parts acid to 100 of water, which gives brilliancy and solidity to the blue tint, and prevents it being washed out by long soaking. This should be followed by two or three rinsings with fresh water, and the print may then be hung up to dry, or placed between sheets of blotting-paper. This mode of reproduction, whose simplicity has led to its adoption in many offices, has the inconvenience of giving a copy in white lines on blue ground, which fatigues the eye in some cases, while the application of other colours is impracticable. By repeating and reversing the process, copying the white line print (which has been rendered transparent by coating with turpentine and wax solution,) first obtained on another sensitive sheet, a positive picture, representing the black lines of the original by blue lines on white ground, can be obtained; or the same result may be reached by a different mode of treating the sensitive paper. This latter may also be made by brushing it over with a solution of ferric oxalate (10 grs. to the ounce); the ferric oxalate is prepared by saturating a hot aqueous solutiou of oxalic acid with ferric oxide. A better sensitising solution may be made by mixing 437 grs. ammonium oxalate, 386 grs. oxalic acid, and 6 oz. water, heating to boiling point, and stirring in as much hydrated iron peroxide as it will dissolve.

The commercial ferri-prussiate paper is not as good as it might be; it is not sensitive enough to make a good print in a reasonable time, nor is it durable, for no matter how carefully it may be kept it changes colour. A paper which has lost its deep orange-yellow cast, and has assumed the greenish-blue tone, is not fit for use and should be discarded. To overcome these sources of failure, it is necessary to coat the paper thinly with a solution of starch or albumen coagulated. Gelatine, being a ready absorbent of moisture, is not recommended for this purpose; its presence would decompose the sensitised surface. And though not differing much, yet the following sensitising solution has been found even more effective, upon this coated paper, than the foregoing :—

(*a*) Citrate of iron and ammonia	-	1 ounce	7 drachms.
Water - - - - - - -		8 ,,	0 ,,
(*b*) Ferricyanide of potassium -	-	1 ,,	2 ,,
Water - - - - - - -		8 ,,	0 ,,



PRINTED WITH A. B. FLEMING & CO.'S LITHOGRAPHIC INK.

Rose Red, Lab. No. 650, at 6/6 per lb.

&C.R.Ltd.

After filtering, these solutions are mixed in equal quantities, and to the mixed solution is added one grain of potassium bichromate. Paper prepared with this mixture has been known to retain its colour three to five months. In any case, the solution is coated on the paper with a soft brush or sponge, rather than by attempting to float the paper on the solution.

It has been suggested that potassium carbonate is useful in this sensitiser, but experience has shewn that such addition softens the paper too much.

(2.) PROCESS OF PRODUCING BLUE POSITIVE PRINTS.—Several varieties of paper called "cyanoferric," or "gommoferric," are sold, which have the property of giving a positive image. The mode of preparation is nearly the same for all: 3 solutions, one of 6 oz. gum arabic in 30 of water; one of 4 oz. ammoniacal citrate of iron in 8 of water; one of $2\frac{1}{2}$ oz. iron perchloride in 5 of water, are allowed to settle until clear, then decanted, mixed, and poured into a shallow dish, the sheets being floated on the surface as before, and hung up to dry. The solution soon becomes turbid, and must be used immediately; but the paper once dry is not subject to change, unless exposed to light or moisture. The reactions involved in the printing process are more complex than in the first process, but present no particular difficulty. Under the influence of light and of the organic acid (citric), the iron perchloride is reduced to protochloride, and, on being subjected to the action of potassium ferrocyanide, the portions not reduced by the action of the light, that is, the lines corresponding to the black lines of the original drawing, alone exhibit the blue coloration. The gum plays also an important part in the process by becoming less soluble in the parts exposed to light, so as to repel in those portions the ferrocyanide solution. The mode of printing is exactly the same as before, but the paper is more sensitive, and the exposure varies from a few seconds in sunshine to fifteen or twenty minutes in the shade. The exact period must be tested by exposing at the same time a slip of the sensitive paper under a piece of paper similar to that on which the original drawing is executed, and ruled with fine lines, so that bits can be torn off at intervals, and tested in the developing bath of potassium ferrocyanide. If the exposure is incomplete, the paper will become blue all over in the ferrocyanide bath; if it has been too prolonged, no blue whatever will make its appearance, but the paper will remain white; if it is just long enough, the lines alone will be developed in blue on a white ground. During the tests of the trial bits, the printing frame should be covered with an opaque screen to prevent the exposure from proceeding further. After the exact point is reached, the print is removed from the frame and floated for a few moments on a bath of saturated solution of potassium ferrocyanide, about 1 oz. of the solid crystals to 4 of water. On raising it, the design will be seen in dark blue lines on white ground. It is necessary to prevent the liquid from flowing over the back of the paper, which it would cover with a blue stain, and to prevent this the edges of the print are turned up all round. On lifting a corner, the progress of the development may be watched. As soon as the lines are sufficiently dark, or blue specks begin to show themselves in the white parts, the process must be immediately arrested by placing the sheet on a bath of pure water. If, as often happens, a blue tint then begins to spread all over the paper, it may be immersed in a mixture of 3 parts sulphuric or 8 of hydrochloric acid, to 100 of water. After leaving it in this acidulated liquid for ten or fifteen minutes, the design will seem to clear, and the sheet may then be rinsed in a large basin of water, or under a faucet furnished with a sprinkling nozzle, and a soft brush used to clear away any remaining clouds of blue; and finally, the paper hung up to dry. The ferrocyanide bath is not subject to change, and may be used to the last. If it begins to crystallise by evaporation, a few drops of water may be added. The specks of blue which are formed in this bath, if not removed by the subsequent washings, may be taken out at any time by touching them with a weak solution of soda or potash carbonate. The prints may be coloured in the usual way.

Either of the foregoing processes when manipulated to produce positive copies, are available by lithographic artists for producing a number of feint impressions of a design for colouring up in different schemes of harmony or contrast, and thereby forming a ready multiplication of sketches.

(3.) BLACK NEGATIVE, OR POSITIVE PRINTS.—Blue figures on a white ground are changed into black by dipping the proof in a solution of 4 oz. common potash in 100 oz. water, when the blue colour gives place to a sort of rusty colour, produced by iron oxide. The proof is then dipped in a solution of 5 oz. tannin in 100 oz. water. The iron oxide takes up the tannin, changing to a deep black colour; this is fixed by washing in pure water.

(4.) JOLTRAIN'S METHOD OF POSITIVE PRINTS.—Black lines on white ground. The paper is immersed in the following solution:—25 oz. gum, 3 oz. sodium chloride, 10 oz. iron perchloride (45° B.), 5 oz. iron sulphate, 4 oz. tartaric acid, 47 oz. water. The developing bath is a solution of red or yellow prussiate of potash, neutral, alkaline, or acid. After being exposed, the positive is dipped in this bath, and the parts which did not receive the light take a dark-green colour; the other parts do not change. It is then washed with water in order to remove the excess of prussiate, and dipped in a bath containing acetic, hydrochloric, or sulphuric acid, when all the substances which could affect the whiteness of the paper are removed. The lines have now an indigo-black colour. Wash in water, and dry.

(5.) ANOTHER METHOD OF POSITIVE PRINTS ON PAPER OR FABRIC.—Copies of drawings or designs in black and white may be produced upon paper and linen by giving the surface of the latter two coatings of: 217 grs. gum arabic, 70 grs. citric acid, 135 grs. iron chloride, $\frac{1}{4}$-pint water. The prepared material is printed under the drawing, and then immersed in a bath of yellow prussiate of potash, or silver nitrate, the picture thus developed being afterwards put in water slightly acidified with sulphuric or hydrochloric acid.

(6.) POTASSIUM BICHROMATE PAPER.—Benneden states that paper, prepared as follows, costs but one-sixth as much as the ordinary silver chloride paper, is as well adapted to the multiplication of drawings, and

is similar in its manipulation. A solution of potash bichromate and albumen or gum, to which carbon, or some pigment of any desired shade, has been added, is brushed, as uniformly as possible, upon well-sized paper by lamplight, and the paper is dried in the dark. The drawing, executed on fine transparent paper (or an engraving, or woodcut, &c.), is then placed beneath a flat glass upon the prepared paper, and exposed to the light for a length of time dependent upon the intensity of the light. The drawing is removed from the paper by lamplight, and after washing the latter with water, a negative of the drawing remains, since the portions of the coating acted on by the light become insoluble in water. From such a negative, any number of positives can be taken in the same way.

(7.)—By means of gelatine sensitive paper any ordinary thick cardboard drawing can be copied in a few seconds, either by diffused daylight or gas or lamplight, The copy will be an exact reproduction of the original, showing the letters or figures non-reversed. If it is desired to make a copy in the day-time, any dark closet will answer, where all white light is excluded. The tools required are an ordinary photograph printing frame and a red lantern or lamp. The sensitive gelatine paper is cut to the size required laid with the sensitive side upward upon the face of the drawing, and pressed thereon in the usual manner, by springs at the back of the frame, which is then carried to the window and exposed with the glass side outward for two to five seconds to the light, the exposure varying according to the thickness of the drawing. If gas or lamplight is used at night, twenty to thirty minutes' exposure is sufficient. The frame is returned to the dark closet, the exposed sheet is removed to a dark box, and other duplicates of the drawing can be made in the same way. It is thus possible to make ten to twenty copies of one thick drawing in the same time that it usually takes to obtain one copy of a transparent tracing by the ordinary blue process. The treatment of the exposed sheets is quite simple; all that is necessary is to provide three or four large pans or a large sink divided into partitions. The development of the exposed sheets can be carried on at night or at any convenient time, but a red light only must be used. The paper is first passed through a dish or pan of water, and then immersed in a solution, face upwards, composed of 8 parts of a saturated solution of potash oxalate to 1 of a saturated solution of iron sulphate, enough to cover the face of the paper. The latent image soon appears, and a beautiful copy of the drawing is obtained, black where the original was white, with clear white lines to represent the black lines of the drawing. With one solution, six to eight copies can be developed right after the other. After development, the print is dipped in a dish of clear water for a minute, and finally immersed for three minutes in the fixing solution, composed of 1 part of soda hyposulphite dissolved in 6 of water. It is then removed to a last dish of water face downward, soaked for a few minutes, and hung up to dry; when dry, it is ready for use.

(8.) Dieterich's Copying-Paper.—The manufacture may be divided into two parts, viz.: the production of the colour and its application to the paper. For blue paper, he uses Paris blue, as covering better than any other mineral colours. 10 lb. of this colour are coarsely powdered, and mixed with 20 lb. ordinary olive oil; $\frac{1}{4}$ lb. glycerine is then added. This mixture is, for a week, exposed in a drying-room to a temperature of 104°-122° F. (40°-50° C.) and then ground as fine as possible in a paint mill. The glycerine softens the hard paint, and tends to make it more easily diffusible. Melt $\frac{1}{2}$ lb. yellow wax with $18\frac{3}{4}$ lb. ligroine, and add to this $7\frac{1}{2}$ lb. of the blue mixture, mixing slowly at a temperature of 86°-104° F. (30°-40° C.). The mass is now of the consistence of honey. It is applied to the paper with a coarse brush, and afterwards evenly divided and polished with a badgers' hair brush. The sheets are then dried on a table heated by steam. This is done in a few minutes, and the paper is then ready for the market. The quantities mentioned will be sufficient for about 1000 sheets of 36in. by 20in., being a day's work for two girls. For black paper aniline black is used in the same proportion. The operation must be carried on in well-ventilated rooms protected from fire, on account of the combustibility of the material and the narcotic effects of the ligroine. The paper is used between two sheets of paper, the upper receiving the original, the lower the copy.

To Protect and Preserve Drawings on Stone.

The protection of drawings on stone is an important question in all lithographic establishments. The common rule is to roll the stone up with printing ink and gum it; but, popular as this plan is, the gum is sometimes liable to scale away, leaving the stone exposed to damage. A new plan to the same end, applied with great success, is as follows:—A preservative compound is composed of the following ingredients: 150 parts spermaceti, 140 parts Burgundy pitch, 90 parts olive oil, 50 parts white wax, 30 parts Venetian turpentine. The spermaceti, pitch, and wax are melted together. Having allowed the mixture to cool slightly, the oil is added, and when the mass has cooled still further the turpentine is added. To secure absolute mixture, it may be warmed and well stirred. In use, the stone is carefully washed out, and rolled up in the above preserving ink. It is allowed to stand for an hour, then a sheet of paper, previously gummed over with fresh thin gum arabic, is placed upon the stone in such a manner as to exclude all air bubbles under the paper. Even these precautions are not absolute protection, unless a few drops of carbolic acid are put in the gum arabic.

American Litho. Stones.—We hear a good deal at times about the extensive discoveries of litho. stones in the United States, but from the report of the Census Bureau relating to the minor mineral industries of the country, the production last year amounted in value to only $243, or about £50—not a very promising result. On the other hand we hear of a constantly increasing employment of zinc plates, especially where large sizes are required. There should be a good opening over there for the Patent Litho. Zinc Plate Company.

Improvements in Photo-Lithography.

A New Salt Used.—The Process Cheapened.

Professor Husnik is one of those enterprising chemists who never tire of experimenting, so long as the aim in view has a beneficial effect upon the industry in which he has made so many improvements. One of these discoveries has not been known to the public more than a few months, and its commercial value is sufficiently important to warrant its repetition.

Since the day of the discovery of the sensitiveness to light of potassium bichromate, it has been almost exclusively used as the oxidising agent for photo-lithographic and applied processes. More recently, however, the properties of ammonium bichromate have been tested, and it has proved a valuable addition to the agents in use. Not a few skilled manipulators have discarded the potassium salt for the ammonia compound. But Professor Husnik has carried his researches still further, and has substituted sodium bichromate for either or both of the before-named compounds. Not only has he *proved* it eminently successful in photo-lithography, leimtypy, pigment processes, dusting-in processes, and the latest method—water licht-druck process—but he also demonstrates *why* it should be successful.

Sodium bichromate in a *pure* condition is considerably cheaper than its potassium confrère; for whilst potassium bichromate costs 1/6 per pound, the sodium salt is only 6d. Therefore, where the photo-printing operations are carried on to a large extent, and the unavoidable waste is so great, this difference in price means a large saving. Whilst saving in cost, the compound contains more energy than potassium bichromate. These salts of chromium consist of potassium and chromic acid and sodium and chromic acid, and one molecule of each does not weigh the same. In chemical formula, the potassium salt is represented by $K_2 Cr O_4$, and the sodium salt by $Na_2 Cr O_4$. In each case the amount of chromic acid is the same, viz., 116·24 parts by weight; whilst the weight of the potassium (39·04) is greater than that of the sodium (22·99). Therefore, in purchasing 162·22 ounces of sodium bichromate, there is just the same amount of chromic acid as in purchasing 194·32 ounces of potassium bichromate. In the quantities thus given, there is a clear loss of 32·1-ozs. at the enhanced price of 1/6 per lb. As it is for the free oxygen of the chromic acid that these materials are used, it is immaterial which compound is used so long as the "base" does not affect the work in hand; thus, for the same quantity of chromic acid combined with sodium it would cost 5/1, whereas combined with potassium the cost would be 18/2.

As it has been with many other materials, until a definite demand becomes known, the sodium bichromate of commerce is scarcely as suitable as it might be for the photo-printing processes. The advantage it holds in the pure state, of having a larger proportional weight of chromic acid, is to some extent negatived by the commercial salt containing a larger proportion of water than is necessary. The extra weight of water has been left in for the convenience of dyeing establishments, and chemical manufacturers would as readily produce it with less water—of course, at a slightly higher price—to meet the demand newly created.

Putting this minor difficulty on one side, there is yet another advantage in the sodium salt being very readily soluble in water, which is a property not to be overlooked. Users of potassium bichromate are too well aware of the aptitude of that salt to crystallize when the amount of water in a mixture goes below a certain point. This, however, cannot happen with the sodium salt, and no fear of crystallization need be entertained when a strong bath is used, or when a large quantity has been added to the albumen, gelatine, etc. To dissolve 1-oz. of potassium bichromate, it is necessary to use at least 10-ozs. of cold water; in hot water, 5-ozs. are sufficient. Sodium bichromate will dissolve in the proportion of 1-oz. of the salt to 2-ozs. of cold water.

Notwithstanding the differences which exist, and the slight alterations necessary in the manipulations, Professor Husnik says, in conclusion:—"I can warmly recommend this salt for all reproductive processes, and I am certain that everyone, after a first trial, will continue to use the same."

A Recent Patent.

Method of Transferring Woodburytype Prints.

(By W. C. Burrows, Hanwell, Middlesex).

The object of the invention is to render the process of transferring the Woodburytype print from the temporary to the final support possible without the use of any solvent for the waterproof coating of the temporary support. To effect this object the temporary support of paper is coated with wax, paraffine, or other fatty matter before it is waterproofed by coating with the shellac preparation. The wax thus intervenes between the shellac coating and the paper, and, by closing the pores of the latter, prevents the shellac from adhering so strongly as to necessitate the use of a solvent for the shellac, to enable the print to be detached from the temporary support in the operation of transferring to the final support.

Two claims embrace the operation as described.

Granulated Paper for Litho. Work.—Granulated paper is prepared in the following manner:—Prepare a mixture of clear starch of a suitable consistency, strain it through a sieve, and spread it evenly over the surface of your paper, which should be of a strong unglazed character. Lay in tray to dry. Afterwards treat in the same manner as India transfer paper, slightly damping it between moist sheets. Place the prepared sheet, face downward, upon the stone, lay over it a cloth displaying the texture you desire your paper to exhibit, and run through the press, afterwards allowing the paper to dry in the air.

Photocollography.

How to Print Collotypes from the Machine.

It is now certain that positive proofs may be easily printed with fatty inks. When the number of proofs required from a plate is not very large, a small and inexpensive outfit will suffice for the practice of photocollography. With this view, Mr. Balagny has just organized a new system of printing on supple bichromate plates. This learned operator, who is a contributor to the *Moniteur de la Photographie,* suppresses the stove, the stone, and cumbersome presses; but the most important modification is that of replacing the litho. stone by a simple sheet of zinc.

When rough zinc is used, it should be well rubbed with pumicestone in order to render the surface quite smooth. It should then be rinsed in clear water, and, without wiping, Mr. Balagny causes the supple bichromate plate to adhere. The adherence is effected by interposing a layer of gelatine. Both sides of the zinc are then wiped. Holes are made at the two angles on the side corresponding with the entry of the cylinder, and the zinc is mounted for printing. Nothing is more convenient than printing on zinc, which may be placed so as to have the image in the most desirable situation on the paper.

When the printing is completed, the zinc is removed and preserved with its supple plate, to be used whenever it may be required.

The supple plate may even remain on the zinc, and will be found very useful in case a large number of proofs are required. If solidity is desired, it may be obtained by pumicing the zinc until the surface is quite smooth. If, on the contrary, it be desired to remove the supple plate after printing, the zinc is treated with essence of turpentine and wiped with a rag dipped in the essence. The small quantity of fatty substance remaining prevents complete adherence, and permits of detaching the supple plate from the zinc.

Mr. Balagny's method renders photocollography more practical than formerly. The suppression of the stones, which are both cumbersome and expensive, admits of conveniently preserving a quantity of plates which would otherwise have been effaced, and which may afterwards be of great service in case repeats are required.

Photocollography in colours.—Last year Mr. Cros published an account of a process called hydrotypy, of which the following is a summary description:

"Hydrotypy, properly so called, is the production of monochrome proofs by means of watery ink.

"A gelatine plate is treated with a copyable coloured solution, which must be allowed to penetrate the gelatine; this having absorbed a certain quantity of the solution, it follows that a series of proofs may be pulled without fresh colouring matter. This method permits of obtaining monochrome proofs of any tint, and may, by superposition, be also applied to photopolychromes. It will be perfectly applicable to polychrome proofs made up of three colours—red, blue, and yellow."

These lines contain the germ of the process of collographic printing with water colours—a process susceptible of practice concurrently with chromolithography and chromotypography, without perhaps being superior to printing with fatty ink. "We have now," says Léon Vidal, the eminent photographer, "to conduct this germ to its complete development, and to carry out anticipations beyond those of Mr. Cros, in seeking by means of this process, a method of polychrome impression, not by superposition, but by a single revolution of the multicolour press."

Moreover, non-photographic hydrotypy has been practised for some years, by the aid of the apparatus known as the chromograph, to obtain a certain number of copies of original manuscripts or drawings.

If, instead of proceeding in the same manner as with the chromograph, a positive be printed on a plate of bichromated gelatine, the part of this layer coagulated by the light will not swell, and consequently will not absorb the colouring liquor poured on its surface. The non-coagulated parts may, however, be saturated with it, and if a sheet of white paper be pressed on the surface of the gelatine plate thus treated, it will take a coloured impression, leaving the image white. —*Moniteur de la Photographie.*

Ivory Carton Printing.

Ivory carton is a very hard pasteboard with an ivory finish, resembling very much the carton-pierre or papier-maché composed of whiting, glue, and paper pulp, now so popular for pressing into moulds to form photograph frames, statuettes, etc. Such a medium for printing upon, if not carefully dealt with, presents considerable difficulties. In printing, it is found that the hard face prevents direct absorption of the ink, and naturally the drying is much delayed. To obviate this, the ink must be kept fairly stiff, to insure its adherence to the carton, and to prevent it drying upon the surface without becoming firmly attached, a small addition of boiled-oil, petroleum, or inkoleum is allowable, but there must also be added some liquid drier. If, in its favourite use for visiting cards, the carton has to be printed from a plate, then the ink may be softened with weak varnish or well boiled oil, and turpentine is added to reduce it sufficiently to be used in the "ball": to this should be added a few drops of liquid drier—say 3 drops to a teaspoonful of ink. In some cases, with due care, it becomes necessary to add a small quantity of gum or flour paste to the ink, which assists in adherence, and allows of the stone being kept clearer during printing.

Photographer—Raise the chin a little, please.

Victim—Am I all right otherwise?

Yes.

Just want the chin a little higher?

Yes; that's all.

Anything to accommodate you.

(Takes out his false teeth, closes his mouth, and his chin comes up to his nose.)—*Chicago Tribune.*

SPECIMEN FROM "DESIGNS FOR GRAPHIC ARTISTS."

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Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

·G·C·R·L^TD·

The "British Lithographer" Examination Papers.

Result of First Examination Paper, set December 1, 1891

ELEMENTARY.

Names or Initials of Candidates.	Nos. of Questions Worked.	Full Marks obtained for Answers to Nos.	No. of Marks given for each respective Question worked.	Total.	Possible on questions answered.
*W. H. Armitage, Manchester.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	VI. XI. XIII.	I. 10, II. 12, III. 8, IV. 12, V. 8, VI. 10, VII. 8, VIII. 12, IX. 15, X. 12, XI. 10, XII. 10, XIII. 10.	137 [70·25 per cent.]	195
E. A. Coups, Manchester.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	IV. VI. XI.	I. 10, II. 10, III. 12, IV. 20, V. 8, VI. 10, VII. 6, VIII. 10, IX. 16, X. 10, XI. 10, XII. 0, XIII. 6.	128 [65·64 per cent.]	195
W. S. Fraser, Derby.	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12	XI.	I. 12, II. 12, III. 10, V. 3, VI. 6, VII. 10, VIII. 5, IX. 17, X. 8, XI. 10, XII. 5.	98 [59·39 per cent.]	165
W. R. Streeter, East Croydon.	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13	XI.	I. 10, II. 10, III. 12, IV. 10, VI. 6, VII. 5, VIII. 5, IX. 10, X. 10, XI. 10, XII. 0, XIII. 5.	93 [50·26 per cent.]	185
†C. E. Cooke, Quorn.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	—	I. 8, II. 6, III. 10, IV. 10, V. 8, VI. 5, VII. 12, VIII. 0, IX. 8, X. 8, XI. 2, XII. 0, XIII. 2.	79 [40·51 per cent.]	195
D. S. Kerr, Edinburgh.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13	—	I. 5, II. 6, III. 5, IV. 5, V. 5, VI. 6, VII. 6, VIII. 5, IX. 12, X. 5, XI. 5, XIII. 6.	71 [39·55 per cent.]	180
A. B. Hodges, West Bromwich.	1, 2, 3, 5, 6, 7, 8, 9, 11, 12, 13	XI.	I. 1, II. 2, III. 3, V. 0, VI. 5, VII. 5, VIII. 12, IX. 12, XI. 10, XII. 1, XIII. 6.	61 [39·35 per cent.]	155
James Dean, Norwich.	1, 2, 3, 5, 7, 8, 9, 10, 11, 13	—	I. 5, II. 3, III. 3, V. 5, VII. 5, VIII. 3, IX. 12, X. 8, XI. 0, XIII. 4.	48 [32 per cent.]	150

ADVANCED.

Names or Initials of Candidates.	Nos. of Questions Worked.	Full Marks obtained for Answers to Nos.	No. of Marks given for each respective Question worked.	Total.	Possible on questions answered.
‡Henry Hendrie, Leith.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	III. VIII.	I. 25, II. 20, III. 25, IV. 30, V. 15, VI. 20, VII. 15, VIII. 20, IX. 20, X. 18, XI. 25, XII. 30.	263 [76·23 per cent.]	345
R. Snowdon, Accrington.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	—	I. 20, II. 20, III. 20, IV. 20, V. 12, VI. 25, VII. 10, VIII. 15, IX. 20, X. 15, XI. 20.	197 [64·59 per cent.]	305

* Although this is numerically the best set of answers, yet there is disclosed a want of correct understanding of the chemistry of the art.

† The answer to No. 8 is a *verbatim copy* of the answer given in The British Printer of July-August, 1890, to the question set for apprentices at Manchester. This fact greatly discounts the value of all the other answers.

‡ An exceedingly good set of answers, shewing a close acquaintance both with the literature of the subject, and with the business itself.

The percentages are struck upon the total obtainable on the questions answered and not on the total marks for the whole paper.

The First Prize Paper will be printed in our next issue.

The following are the Question Papers for the Second Competition. Conditions will be found in No. 2, and the Prizes will be the same. Answers should be sent in on or before March 1st.

Elementary Questions.

1. What is the theory of lithography? (15)

2. What is the action of water in lithography? What is the action of grease in lithography? (20)

3. What is the action of gum in lithography? What is the action of acid in lithography? (25)

4. What is the nature of a lithographic stone? What is the colour of the best stones? Why are pale-blue stones preferred for chalk work? (20)

5. If you etch a stone too strongly or too weakly, what will be the result in each case? (25)

6. What are the component parts of lithographic ink? What is the action of soap in lithographic ink? (25)

7. What is lithographic printing varnish? (15)

8. What is transfer writing paper? Why is it coated? With what is it coated? (25)

Advanced Questions.

1. Why are oils burnt instead of used pure? What would be the result if you worked with pure oil? (25)

2. What are the component parts of lithographic chalk? What is the use of shellac in lithographic chalk? (20)

3. What are the component parts of good lithographic black ink? (10)

4. What is the difference between writing transfer paper and plate transfer paper? (15)

5. What are the advantages and disadvantages of the duct for the ink on lithographic printing machines? How have some of the disadvantages been overcome by mechanical improvements? (25)

6. How is Naples yellow mixed and used in printing? (15)

7. How is the pressure applied in lithographic machines? Give a sketch of the mechanism. (30)

8. Describe the method of "lay" register, and shew its advantages or otherwise over other methods of register. (20)

Reduction of Hours in Manchester.

PRESENTATION TO MR. R. W. WATTERS,
THE SECRETARY OF THE
ALLIED PRINTING AND BOOKBINDING TRADES.

ON Saturday, January 2nd, the committee of the allied Printing and Bookbinding trades of Manchester, together with a few friends, prominent members of the four societies, met to spend a social evening and to present a testimonial to Mr. Watters, the secretary of the committee, in recognition of the services which he so ably rendered during the fourteen months of the activity of the committee.

Mr. Brady, of the Bookbinders' Society, chairman of the allied committee, took the chair on this occasion and opened the proceedings with some suitable remarks on the duties of officials connected with societies generally, adding the very trite expression of his opinion that frequently such officials have more to contend against with the members of the societies themselves, than with the majority of right-minded employers.

After the opening had been effected, considerable harmony was mixed with the duller business of the gathering, and the time ran merrily along till "time" caused an involuntary dissembling.

Mr. Watters gave a concise account of the whole transactions of the committee, and described the result as a bloodless victory, the reduction having been given in *all* departments of the trade throughout the city, not only to the male but female employées. To the latter, however, he was sorry to say there was still an exception, which it was trusted would ere long be removed. In the course of his remarks he referred to his connectionwith his society for twenty-five years, and his connection with movements of a similar character. He also dwelt upon the necessity of stronger alliance between men in one trade, and the desirability of getting the women into closer union amongst themselves. He read a letter from Mr. King, of the Melbourne (Australia) bookbinders, congratulating the vellum account-book binders on the result of their efforts for a reduction of hours, and referring to his (Mr. King's) recent tour through this kingdom, with which he expressed himself heartily satisfied, but he also felt surprised that a large centre of unionism like Manchester was without a Trades' Hall, whilst in Melbourne the societies had buildings to the value of £60,000 entirely in their own hands.

The principal purpose of the meeting was considerably delayed, in the hope that Councillor G. D. Kelley, general secretary of the Lithographic Printers' Society, would ultimately be able to leave a meeting in another part of the city, and be present to perform the duty of presenting the testimonial to Mr. Watters. However, he did not arrive, and in his absence, the presentation was undertaken by Mr. C. Harrap, of the Lithographic Artists' Society, who took the opportunity of dwelling upon the reduction of hours as a national movement and legislative enactment, tracing its progress from the Dundee Trades' Congress, through Liverpool Congress, where it obtained a meagre majority of 38 votes, and on to the Newcastle Congress, when the skilfully worded proposal of Mr. Keir Hardy bridged over all the questions as to trade option, coupled with a legislative measure, obtained the support of 341 delegates against 73. And he felt convinced that, although in Manchester one trade had by organized effort secured a reduction, yet if the whole body of workers, male, female, and infant, were to have the advantage of reduced hours, it could only be effected by one great stroke of the legislature against overwork, pointing out that by this means only the country could be saved from a number of struggles in every industry, with a corresponding creation of bitterness of feeling and large financial waste. He took up the question of female labour in Lancashire, pointing out that the result of such labour, especially for such long hours, must only result in an emaciated progeny, unable to cope with growing foreign competition and unable to keep up the high standard of excellence generally attained by British workmen. He also referred to a closer alliance of kindred trades as well as all trades of the country, and he shewed how by the contribution of threepence per week from each member of each society associated with the Trades' Council of this city, for the brief term of twenty months, the sum of £20,000 would be at the disposal of the council for the hire or purchase of a hall in which all societies could meet and bring themselves into the desirable closer contact. In thus widely touching the subject, he did not omit to express the general high sense of approval which had been accorded on all sides to Mr. Watters for his valuable services, and with one or two facetious remarks on the connection of the timepiece with the receiver, he had the pleasure and honour of presenting to Mr. Watters a handsome marble clock, with an inscribed silverplate upon it, bearing these words: "Presented to Mr. R. W. Watters (by the allied trades, January 1st, 1892,) in recognition of his services as Secretary of the Committee of the allied Printing and Bookbinding Trades of Manchester, which secured the permanent reduction of two and half hours per week, from June 1st, 1891."

Accompanying this testimonial, will be also given a group-portrait of all the members of the committee, when weather permits of it being taken.

The *pièce de resistance* having thus been disposed of, several present added suitable remarks on the general question and in praise of the work done by Mr. Watters. Mr. Watters made a very appropriate reply and, in concluding, hoped that this meeting was not the termination, but the beginning of a closer kinship and joint action in the future.

The meeting however did not conclude its business with this one recognition only, for later on, Mr. Oliver, of the Typographical Association, on behalf of the allied trades, also presented to Mr. Brady, the energetic and industrious Chairman of the Committee, a very handsome wood and amber pipe, with full silver mounting and case. He briefly eulogised the characteristics of Mr. Brady, which had gained for him the respect of the committee for his business-like manner of discharging his duties.

After a few hearty votes of thanks to the Typographical Assoeiation for the kindly use of their offices, and to others, the meeting was brought to a close with singing "Auld Lang Syne."

New Books.

"MATERIA PHOTOGRAPHICA" is the title of another of Messrs. Iliffe & Son's useful publications. It is a truly technical work and is the necessary accompaniment of any well versed photographer or any text-book on photography, for whilst the photographic text-book gives the mode of proceeding only, this work takes up and describes in detail every article of apparatus and every chemical used in photography, thus enabling any amateur to become intimately acquainted with the making of apparatus and preparation of chemicals. The work is divided into five main sections and an appendix, the latter particularly useful for its exhaustive and comparative tables of all classes of measurement, giving a ready means by collateral columns of converting English into French measure, or *vice versa,* and a complete parallel reading of the Centigrade, Fahrenheit, and Réaumur thermometric scales. The work is a new one, and before many editions have run, the author may find that whilst Part III. is in itself a good *record* of "photographic formulary," yet its usefulness might be greatly enhanced by adding the *method of mixing* the chemicals as well as the *quantities* of the chemicals used.

Part IV., "The Utilisation of Photographic Wastes," is undoubtedly a very necessary part of the subject, and one with which all photographic workers need to be thoroughly acquainted.

The name of the author is sufficient to guarantee a large circulation for his work, for Mr. C. J. Leaper, F.C.S., has already written a number of useful photographic and chemical works, and this work is the outcome of his lectures upon photography and chemistry at the Dublin Technical Schools.

THE *Art Amateur*, for January, (vol. 26, part II.) is again replete with matter having a strong interest to both artists and printers. Four excellent coloured plates, illustrating two stages of painting a landscape and a portrait, with a finished copy for a horse's head, are valuable to the amateur colourist, and to the printer as good chromo productions. Besides the coloured supplements, there are two imperial sheets of sketchy outline designs, which in the hands of the designer can be turned to good account. The work itself includes an article on E. Burne-Jones' work, with four illustrations, including the "Golden Stair." Articles on painting Still Life; Modelling, as part of Portrait Painting; Painting in Pastel; Burnt Wood Etching; House Decoration; Metal Work and Leather Work from the Spitzer Museum; and a number of little hints and matters of interest to workers of all artistic grades.

THE *Magazine of Art*, for December, contains a fine etching by J. Desmoulius, after a painting by Alfred Stevens. The January part has a masterly frontispiece by the Berlin Photographic Company, in photogravure, after a crayon drawing by John Russell, R.A. Other than these supplements, the journals have but a passing interest.

THE *Art Journal,* for December, again presents an etching by A. P. Massé, after a fine picture by Stanley Berkeley. It is a good work, but lacks in contrast, and as a picture does not equal the etching of the November part, or that of the January part, by Axel H. Haig. The latter is a "Street of Cologne," and is an attractive picture. The journals are of the usual high-class type, and from the programme issued for 1892 some excellent productions and articles may be expected.

THE *Art Annual* this year covers the work of Briton Rivière, and cannot fail to be of lasting interest and enjoyment to all lovers of animal painting. The three plates are chosen from the painter's most successful exertions, including "Circe," "The Last Spoonful," and "Persepolis," whilst the other illustrations bring to mind several others of his fascinating productions.

An American Transfer Paper.

THE ingredients are:—2-ozs. best wheat flour, 4-ozs. corn starch, 2 leaves of French gelatine, ½-oz. white lead, 5 to 8-ozs. of glycerine. The method of preparation is to make a paste of the flour and water, to which is added the corn starch and sufficient water to make the whole into a creamy paste free from lumps. The gelatine is dissolved in boiling water and added, whilst kept stirring, to the paste. The white lead is ground finely in the glycerine, the quantity of which is small in wet or warm weather and larger in cold. This is added to the paste, and the whole thoroughly stirred for some time. Best enamelled paper is then coated evenly, and when quite dry is coated a second time.

It is customary to give the Americans credit for doing whatever they undertake in a thorough manner, and the foregoing recipe seems to flavour of that same thoroughness. Everything is put into it that is necessary for pulling plate transfers, for writing or drawing upon, and for transferring to warm or wet stone *without stretching.* But it may be argued that it is overdone in its thoroughness, and could have been both cheapened and simplified. If enamelled paper be used then the white lead and glycerine may be omitted. It is questionable whether much good results from using the best wheat flour, which is less glutenous than "seconds" flour, and why should both flour and starch be introduced whilst a small quantity of sugar and common glue with "seconds" flour would meet the case. The whole composition would give a thick "surface" not very hard, and liable to give way to a pen. The introduction of a firm parchment size would materially tend to bind the otherwise soft ingredients. The use of enamelled paper, though more expensive at the outset, can only be equalled by using a heavy printing paper or cartridge, upon which a facing of zinc or white lead has been printed.

No. 4 of the American *Lithographic Journal* shows steady improvement in get up and contents.

Specimens.

[*Will our friends kindly remember to send their specimens either* TIGHTLY ROLLED *or* FLAT BETWEEN BOARDS; *the cost is but a trifle more, and for review they gain in being presented as they came from the machine. If sent unprotected, specimens are usually so crushed and disfigured as to be utterly unfit for criticism or preservation.*]

FROM Mr. A. D. Willis, lithographer, Wanganui, New Zealand, we have some "home produced" Christmas and New Year greeting cards, which are characterised as much by their admirable execution as their novelty and artistic treatment. Of the set of five, two are chromo-lithographed and three in monochrome. The former present respectively views of the famous "White Terrace," destroyed by the eruption in 1886, shewn in two panels in semi-border of native flowers, and a view of Cromwell, N.Z., with semi-border of tawa berries. The other three are respectively, "A Maori Canoe Race," "Thoughts of Christmas," a young Maori woman carrying a sucking pig, and "Her Best Friends," an old native woman enjoying a pipe, with a pet dog slung in her shawl at her back.

MR. G. L. HENDERSON, who has an excellent specimen supplement of his work in this issue, sends us other examples of his ability as an artistic designer and engraver. These include some handsome business cards and his own greeting card, representing, in a panel, a wintry moonlight view with a church in the foreground, and, in a medallion, an interior view of the church, foliage and holly tastefully arranged, with greetings at the foot, completing an artistic picture, excellently printed (direct from plate) in a deep-blue tint on deep-toned Whatman paper.

THE LITHO. ARTISTS' CO., Birmingham, present a tastefully designed new business card, showing a conventional floral design, with the figure of an Italian peasant woman in a medallion on the left-hand side, and their business announcement in very neat lettering in a panel on the opposite side. Excellently printed in a milori-blue on a straw-tinted card with gilt bevelled edges, the effect is neat and chaste.

SOME fine specimens of half-tone work are to hand from the Boston Photogravure Co. (U. S. A.) One, representing the interior of a long picture gallery, is admirably managed, the pictures standing out with wonderful clearness and distinctness. A large group in tints, "A Sister's Charge," is excellently done, though a trifle spotty in some parts.

THE "Shakspeare" calendar from Herr Theodore Stroefer, Munich, consisting of twelve daintily designed illustrations from his plays and poems, is artistic in treatment, admirably printed on fancy edged cards and bound together by silk ribbons. The scenes have been chosen to represent the seasons, and are charming in treatment and colour.

THE business card of Mr. Thos. E. Downey, 47 Berwick-street, W., is a capital example of fine writing engraving, and is admirably printed direct from plate.

THE chromo business card of Mr. Otto Leven, 251 Icknield-street, Birmingham, who has a business announcement on another page, is a charming specimen of illuminated work, proving his ability both as designer and printer. The size of the card—6 × 5 inches—allows of a border an inch wide, which, in the florid Italian renaissance style—conventional floral, with cupids and birds in the panels, and groups of fruit in the corners—is excellently worked out on a solid gold ground. The neat lettering in the centre panel is in gold on a grey stippled tint in a plain line border of light green. A plain narrow band in blue, over which is printed a Greek key border in gold, completes a well-finished piece of work.

THERE is some excellent lithographing in the coloured cover and illustrations of the *Press Annual*, a copy of which has reached us from the *Press* works, Pretoria, South Africa. Colonial politics are dealt with in a grimly humorous way, and the numerous portraits—among them one of the South African "Men of the Day," Mr. Cecil Rhodes, which does duty as frontispiece—are excellently done. There is also a three-page cartoon, and a panoramic view of Church-square, Pretoria. Taken altogether the work is in every way creditable to the *Press* Company, both in treatment and execution, and a study of its contents must have caused many smiles amongst the sturdy colonists at Christmas time.

A CHROMO calendar for '91, issued by Messrs. F. T. Wimble & Co., Sydney, Melbourne, and Brisbane, and executed by Messrs. Gibbs, Shallard & Co., of Sydney, is a very fine specimen of printing, creditable to the technical and artistic skill of the craft in Australia. A prize was offered by the firm for the most suitable design, and the competent judges appointed approved of that sent in by the above-mentioned firm. The inks used in its production were manufactured by Messrs. F. T. Wimble & Co. The lateness of issue is accounted for by the fact that the first batch was destroyed in a fire on the premises of the printers.

THE chromo-lithographed office card calendar (4to) from Mr. E. Shardlow, St. Martin's, Leicester, is a decidedly attractive and carefully executed specimen. The centre shows a moonlight scene with owls flitting about amongst some ruins in the foreground; the lower part of the design is floral; the border shows floral decoration on a broad band of light brown, with plain lines of black and gold outside as a finish, ample white margin giving added effect to the neat colour scheme, in which browns, blacks, and greens are daintily relieved by judicious pickings out in gold.

SPECIMENS of fine copper-plate printing from Mr. Alexander, who has a business card on another page, are amongst the best that come to our notice. Though he only commenced business about a year ago, he has already established a reputation for his work—especially in proofing etchers' and engravers' work, which he makes a speciality, paying great attention to bringing out the best effects of the artist. Those who complain that they cannot get good work of this class should give Mr. Alexander a trial.

IN our last issue we had something to say about the excellent engraved work turned out by Messrs. Royle & Son, of Newgate-street, E.C., and we are now pleased to be able to present a reproduction of one of the designs in their specimen book. It gives a good idea of their capabilities both as designers and engravers. Few London engravers have a wider connexion amongst the trade, their specimens shewing work done for clients all over the United Kingdom.

MR. ARTHUR CHILVER, 6 Snow-hill, E.C., who, on another page, is soliciting letterpress printing from lithographers who do not do their own, submits a number of very tasteful specimens in the best modern style of design and execution, which will commend themselves to the craft at large. Mr. Chilver's growing business has recently necessitated an extension of premises and considerable additions to plant, and he is now in a position to turn out any quantity of good work expeditiously and at fair charges.

DESIGNED AND ENGRAVED BY W. R. ROYLE & SON, 96 NEWGATE STREET, LONDON, E.C., FOR BOOT & SON, 24 OLD BAILEY, LONDON, E.C.

WE are indebted to our esteemed correspondent, the editor of the *Engraver and Printer,* Boston, Mass., for a small collection of beautiful collotype and half-tone work in portraits, views, and groups of plate, all admirably printed; also several ball programmes in which very artistic effects are secured by the judicious use of sepia and brown tints exclusively.

WE recently had the pleasure of inspecting a number of fine specimens of chromo-lithographic work from the works of Messrs. Hobbs & Sons, Maidstone. The artistic portion of the work was equalled by the excellent treatment and execution and the finished effect of the completed designs.

MESSRS. GREAVES & MASON'S business announcement should not be overlooked when buying lithographic supplies. They are Government contractors, and so are compelled to keep ample stocks, and urgent orders may therefore depend on being promptly attended to. They supply everything the lithographer needs, and the quality and prices will bear favourable comparison with any house in the trade.

THE house of F. Horsell & Co., Meadow-road, Leeds, has a well-earned reputation for litho. inks, and supplies such as blankets, rubber sheeting, roller casings, &c. Their inks are favourably known for depth of colour and free working.

Correspondence.

To the Editor of THE BRITISH LITHOGRAPHER.

DEAR SIR,—On page 15 of the first part of your valuable and beautifully got up journal appears "Question 4.—Describe your favourite way of etching and rolling up a delicate chalk drawing on stone." Now my only excuse for intruding on you is simply to describe the way in which I personally etched, say, speaking moderately, some 25,000 or 30,000 drawings, some of them, notably those by Louis Haghe, the most magnificent specimens ever produced in this or any other country; and the whole mass far and away in advance of any chalk work done now. Well, I never etched with a brush and gum and acid mixed, on account of the danger of making streaks across the drawing wherever the gum and acid might by chance be laid on in greater body than in other parts, and because in so much of the work that I knew had been etched in that way I found a deadness and dullness and want of that silver sheen and sparkle that I found in my own way of etching.

Well, my own way, inherited from my father (Wm. Day, who died in 1845), was as follows:—

The stone would be placed in the centre of a large wooden trough, and swung on a frame so that it could be rocked up and down, and in the front of the trough was a hole. In a large jug I would put, say, two quarts of water, and into this water put, say, from half to two-thirds of a wine-glass of nitric acid; mix well together and pour it over the drawing; the trough would be tipped up so that the water and acid would not run out of the hole in front; then I tipped up the trough and caught the water and acid in my jug through the hole in front, and repeated the throwing over the drawing some eight or ten times, till the acid was pretty well exhausted by its acting on the stone. Then I would pour a pure solution of gum arabic over the drawing, taking care not to brush it or rub it over the drawing, and leave it to dry. Then the gum would be washed off; the drawing washed out with turpentine and rolled up in the usual way.

Tint stones would be etched in the same way, but with a much larger quantity of acid in the water,—so that you would see the action of the acid on the stone bubbling up strongly,—while in a chalk drawing you would not detect this bubbling up.

For about twenty years I used every four or five weeks to spend a whole day in making lithographic chalk, as we always used our own make. My usual batch would be about 20lbs. in weight, but then we had, in addition to our own use, a large sale for the chalks.

I could say something about printing from zinc, as fifty-five years ago we did a very large quantity of it, including extensive works on natural history for Professor Owen and others; but I find I have already intruded too far on your space, and I have yet to learn whether the results of practical experience on the best work will be appreciated now.

Yours faithfully,
W. DAY.

Notes and Queries.

[Through this channel anyone submitting a question upon printing or allied processes can receive an answer, either from our staff of practical technical writers secured for this Journal, or from some reader who may be better qualified to answer "special" questions.]

IN reply to Mr. G. Munsey, of Glasgow, we can point out that the composition upon the paper is almost equivalent to a cold stone transfer paper composition, and for printing upon such an artificial surface we refer him to the article in this issue upon "Bronzing and Dusting," especially to the part touching on dull enamel papers. A paper very similar to the sample sent may be prepared by coating a plate (unsized) paper with flour or starch paste. When dry, coat again with a solution of common pale glue (or gum) and starch. The paper is heavily calendered, and to make the surface firmer for printing on, a small quantity of flake white may be added to the composition.

IN reply to "Grove Bank," of Glasgow, it may be said that actual embossing, in its most confined sense of embossing only, has not been worked from engraved stone. But in the calendars published year by year by Messrs. Blacklock & Co., of Manchester, embossing from engraved stone has frequently been practised in combination with a roughened stone to give prominence and light in the picture.

J. H. FIELD, Junr., writes: "Could you furnish me with a receipt for making a transfer paper for drawing or printing upon and transferring to zinc for etching purposes?"

ANSWER: It seems to us that our correspondent has been unable to get the work on the zinc with the ordinary drawing and transferring methods. This is the obstacle usually. It is not in the transferring, but in the zinc that the difficulty lies. If the zinc be prepared, as shewn in the article in this issue, upon Arthur Moses' method, there should not be any difficulty in drawing upon or transferring to zinc. Any ordinary transfer paper will do. In rolling up, it should be gummed, dried, washed over with turpentine, rolled up solid black, sprinkled with water, and rolled till clear. It is then in the same position as a photograph to zinc after rolling up, and can be used for etching into a block.

STEEL-FACED COPPER PLATES.—The chief deterioration that a faced plate undergoes is due principally to the tendency of the pressure, so many times repeated, to drive the iron into the copper, by reason of the latter being so much softer than the former, the result being that the cut parts tend to level up and become practically more shallow. Of course, the harder the copper is originally, the less likely is this defect to show itself. In putting these plates aside after printing they are to be treated just as if they were ordinary steel plates; that is, they must be heated and covered with beeswax to prevent their becoming damp and corroding.

The Amalgamated Society of Lithographic Printers.

THE third annual dinner of the Hanley Branch took place on November 27th, 1891, at the "Boro' Hotel," Miles Bank. An excellent dinner was served up in first-class style by host Granville. The guest of the evening was the genial general secretary, Councillor G. D. Kelly (Manchester). After dinner, the chairman, Mr. Geo. Borrett, who was supported by Mr. G. H. Wheelhouse (vice-chairman), proposed the toast of "Our Guest," hoping that he would long be spared to continue in the capacity he had faithfully and honourably held for so many years. Mr. G. D. Kelley, in responding, said how very much obliged he was to hear such very kind words spoken of himself and his services to the Society, and thanked them for the very hearty reception and in drinking his health with musical honours. His health had not been very good for some weeks, and he did not feel in the best possible trim for speaking, but it was a matter of extreme pleasure to come down there and see his friends in Hanley. He hoped that the success of the Branch would long be insured, and that he should again have the pleasure of shaking hands with them. The next toast was the "Local Firms," proposed by Mr. E. J. Swetnam; followed by "Absent Ones," proposed by Mr. John Mawson; and "The Society," proposed by Mr. Geo. Wright, responded to by Mr. G. D. Kelley, who congratulated the members of the Hanley Branch upon their increase of members and the economical manner in which the Branch was conducted. He also, in a very impressive manner, dealt strongly upon the principles and advantages of union. Joining a society of this character was becoming one of a very large family, a family with extensive connections with every large town where lithography was produced. He also spoke of the *rise* and *progress* of lithography in this district. They had got in Hanley the largest shop in the district, and one which was governed at the present time in harmony with the Society, which has not always been the case. He ventured to say that the feeling existing there between employer and employés was of such a satisfactory character that he believed any difficulties likely to arise could be settled by themselves without the intervention of the Society. The toast of "The Queen" was then proposed by Mr. J. Cartlidge, and "Our Host and Hostess" by Mr. W. J. Rushton, responded to by Mr. John Granville, who suitably acknowledged. The best thanks of the meeting were given to Mr. W. J. Rushton, who again acted as steward, for the very able manner in which the arrangements had been carried out. The musical part of the programme was very successful, and every praise is due to the able accompanist, Mr. J. M. Morris, whose rendering of the pianoforte solos was excellent.

PRESSURE on our space has compelled us to leave over the continuation of M. Valette's interesting article on "Lithographic Technical Education in France," as well as a characteristic paper on "Lithography in a Spanish City," by Walter Lodia.

Nelson's Gelatine.

THE gelatines sold by Messrs. Nelson, Dale & Co. range upwards from gelatine lozenges, table jellies and gelatines, to the purest forms of gelatine designated the Amber, No. 1, No. 2, and "X opaque" photographic gelatines and isinglass at 8/- and 8/6 per lb. The manufacturers do not include either Amber gelatine (4/6 per lb.) or isinglass among the photographic preparations, but draw the line distinctly at the No. 1, No. 2, and X opaque.

Number One is a very good quality of gelatine, sold in fine transparent threads, which are not so brittle as No. 2. It is especially adapted to autotype or carbon printing, Woodbury and Eburneum processes, photo-lithography, gelatino-iron developers, mounting and enamelling photographs, and such other purposes as require a readily soluble gelatine. It can be obtained through most photographic chemists, and is made up in ½-lb. packets at 6/- per lb.

Number Two is less soluble, and is not quite so high in quality. It can be purchased in threads usually wider than No. 1, of a yellowish caste, and far more brittle. This gelatine, prepared in ½-lb. packets at 5/- per lb. is, however, the suitable article for heliotype, collotype, zinc-block process, transfer paper for carbon printing, salted paper, and such other processes in which a hard and less soluble gelatine is required.

Special "X Opaque" is much more expensive than Nos. 1 or 2, being at least 8/- per lb. It is prepared in threads wider than No. 2, but owing to its greater brittleness is sold in short pieces. It lacks the brilliance of either Nos. 1 or 2, being a dull yellowish opaque material. Its superior quality fits it for the highest class of photographic work.

These preparations of gelatine are far more soluble than the harder varieties in the market; for instance, No. 1 gelatine will become sufficiently soft for all ordinary purposes after soaking for five minutes in water at 65°F.

In cases where the softened gelatine is made into a solution by heating with more water, the temperature should not go above 110°F, and the solution should not be kept at that heat for any length of time, or the properties of the gelatine will be destroyed.

Again, gelatine in solution should not be prepared in larger quantities than required for immediate use, because, in summer time especially, it readily decomposes and is unfit for use.

AMONG the objects exhibited during the last meeting of the "Fachtechnische Club" of the State Printing Office in Vienna, there were some celluloid plates by Mr. August Denk, proprietor of the embossing establishment at Vienna, containing transfers from copper engravings. These celluloid plates, which have a milk-white appearance, are somewhat transparent and flexible, and are so hard that they may be printed from the same as a copper plate. The proofs exhibited demonstrate that the impressions are as clean and perfect as those made from the original plate.

The Leeds Photographic Exhibition.

The promoters of this Exhibition, held on December 7th, 8th and 9th, succeeded in bringing together a very interesting collection of photographic art work, most of it of a decidedly high standard of execution. The walls of the upper rooms of the Municipal Art Gallery, in which the exhibition was held, literally teemed with admirable specimens of photographic art. Here one saw at a glance what strides have been made since the palmy days of the daguerreotype. Some hypercritical individuals steadfastly maintain that photography is not art. How untenable their position is, could not be more clearly demonstrated than by an inspection of the specimens brought together. In the present day the photographer's sole aim is not to get a likeness. He must turn out a picture. There were, first of all, a number of portraits of old Leeds worthies, and then a collection of photographs illustrating "Old Leeds." Members of the younger generation would scan with lively curiosity pictures of such objects as Old Leeds Bridge, Boar-lane as it was before the Corporation widened it, and so on. From these attention was arrested by a series of exhibits by the proprietors of the *Graphic*, showing the various stages in the preparation of blocks from which pictures in newspapers are printed. Then came a series of scientific photographs, some bromide enlargements of photographs of the Leeds coal measures, with valuable particulars appended, being of more than ordinary local interest.

In the East Room there were splendid collections of animal studies, groups, and figure studies, many of them very beautiful; outdoor groups and a large collection of marine pictures, the majority of which had a very refreshing and breezy effect. Some portraits were also displayed here, and, in the centre of the room, a quantity of fine lantern slides were seen to good advantage. In the South Room were arranged a splendid collection of landscape photographs. The degree of perfection attained in the production of these prints commands admiration. On the north wall were shown the entries in the championship class, a very fine collection. The West Room was given up to portraits, of the excellent qualities of which it would be difficult to speak too highly.

On the Saturday evening following, a lantern lecture was given in the Art Gallery by Mr. William Wright (Leeds Photographic Society), on "Picturesque Yorkshire." The lecturer, in a racy fashion, took his listeners pleasantly through some of the most picturesque and historical parts of the county. The range of district was very wide, including York, the Vale of York to Helmsley and Ryedale, the coast and adjacent country from Flamborough to Marske, Richmond, Lower Swaledale, Barnard Castle to Teesdale and the High Force, Wensleydale and Upper Swaledale across to Ingleton, and the Vale of Craven, Knaresborough and Nidderdale as far as Howstean, Ripon, Fountains, Hackfall, and Masham, Ilkley and Wharfedale, Kirkstall and Airedale. The lecture was thoroughly enjoyed by a large audience, signs of appreciation being frequent. A perfect storm of applause followed the lecturer's description of the river Aire, as "starting in the pure vigour of fresh boyhood at Malham, getting into bad company at Skipton, becoming thoroughly dissipated near Bradford, losing all self-respect at Leeds, and finally, meeting with a fellow-sinner (the Calder) at Castleford, is lost in grateful oblivion, unhonoured and unsung, save by Alderman Ward and Councillor Ambler." A hearty vote of thanks was accorded to the lecturer, on the motion of Councillor Dyson. The lecture was illustrated with about 140 slides, made by Messrs. Bingley, Dawson, Denison, Rodwell, Warburton, Wright, and members of the Darlington Photographic Society.

SPECIMEN FROM "DESIGNS FOR GRAPHIC ARTISTS."

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THE BRITISH LITHOGRAPHER

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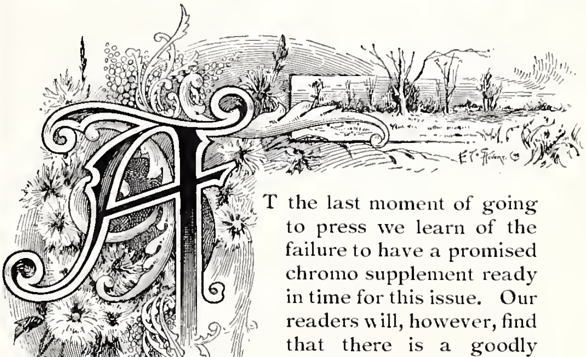


AT the last moment of going to press we learn of the failure to have a promised chromo supplement ready in time for this issue. Our readers will, however, find that there is a goodly array of other illustrations, which will no doubt be found both useful and instructive.

THE artistic series of Initials for Illuminating begun in this number will be continued till completed, and we think they will be found both useful and suggestive.

IT is hoped that some examples of photo-lithography, in illustration of the series of papers on the subject now running in our pages, will also be ready for next issue.

ARRANGEMENTS have been made with Mr. Hugh Paton, of Manchester, a member of the Society of Painter-Etchers, to contribute a series of papers on Etching, which will commence in our next number and will be illustrated by the author.

OUR readers will no doubt be pleased to learn that the subscription list of the B. L. is steadily growing, amongst both employers and employés. We are anxious, however, to add to the attractions and usefulness of the journal, and to enable us to do this, we must have still more subscribers. Will every one of our readers each make an effort to secure at least one more subscriber?

WILL prospective advertisers who are "waiting to see how the B. L. progresses," take note of the steady increase of representative firms in our advertising pages, and "come over and help us!" The B. L. is now the only organ of the lithographic trade in the United Kingdom, and its influence is growing rapidly.

The Litho Technical Classes.

In connection with the Leicester and Derby classes, a "record" day was spent by a number of the students on Thursday, March 10th. The Leicester class has kept up its large attendance in a most remarkable and satisfactory manner, and through the interest of Mr. Hall, the popular teacher, advantage was taken of an opportunity to improve the theory obtained from the lessons on paper printing and manufacture by paying a visit to establishments connected with paper making and wall paper printing on the outskirts of Derby.

About seventeen of the Leicester students, with Mr. Lead, the chairman of committee, and Mr. T. B. Widdowson, hon. sec., travelled to Derby, arriving there at about 1 p.m., being met by Mr. Hall, and were first conducted to the Museum and Picture Gallery. A short time was profitably spent in examining some of the works of art in that institution, till another start was made, and being joined on the way by a number of members of Mr. Hall's Derby class, the party moved on to the first establishment to be visited, that of W. G. Wilkins & Co., Limited, which was most courteously thrown open for inspection, and a guide placed at the disposal of the visitors.

The wide permission given enabled the visitors to see almost the whole of the various departments of the establishment in turn, and thus to follow all the various stages in the printing of wall papers. After passing the stacks of paper ready for the customer, the ink-mixing department was visited, and much that was interesting was found at this stage. As someone said, there were samples of colour combinations on the faces and clothing of the numerous workers. On the way to the printing machines, the cellar used for the storage of rollers not in actual use was visited, and the guide gave some interesting details about the number of rollers in use, cost, register arrangements, etc. The printing machines proved the great centre of attraction, and a considerable time was spent in observing the working and obtaining information and explanations from the guide and Mr. Hall as to the why and the wherefore. The students had evidently come primed with questions, and the work in hand afforded scope for much enquiry and absorbing interest, so that the various processes of arranging the order of rollers, starting, inking arrangements, etc., together with the unique arrangements for drying and taking-off, were witnessed and commented upon. Every facility was afforded for individual examination of the working, and most of the students availed themselves of the opportunity to see all for themselves, many of them even going aloft to note the heating apparatus for drying the paper after leaving the machines. Though this involved something in the nature of a Turkish bath, the arrangement for quickly drying the paper was one calculated to give many "wrinkles." Machines working off four to eight colours were seen at work, others putting in the ground tint only.

Going upstairs and following the paper after drying, the small machines for cutting the lengths in equal "rolls" were seen busily at work, and the mechanism explained. Notice was taken of a small roller machine for graining printed papers, an apparatus for binding several rolls together, collating for specimen books, etc.

The premises being lit with the electric light, the engineer explained the details of the working and gave much information of a practical character on the subject, illustrated alongside the switches and by turning on the light for a time.

The designing room was next visited, and patterns for the forthcoming season were shewn, Mr. Wilkins and his assistant kindly giving much information as to the printing, colours, designing, values, etc., of papers in hand. After thanking Mr. Wilkins for his courtesy and kindness, the party withdrew.

A long walk over the snow brought the party to the paper mills of Messrs. Evans & Co. As with the first visit, every courtesy and consideration was afforded to the visitors, and the questions asked—and their name was legion—were willingly answered. The utilisation of paper cuttings, the tanks in which the pulp was left to bleach, and the cutting, washing, and bleaching mills were first visited, and as one of the mills was at work with wood pulp, another with rags, another with rags and wood pulp, etc., much scope was afforded for enquiry. After visiting the rag cleaning and cutting room and rag boiling apparatus, the *pièce de résistance* in the shape of the paper-making machines in full work were minutely examined, the guides, engineers, and Mr. Hall endeavouring to explain everything to the interested observers. The action of the various parts of the machines, perhaps more especially that of the suction action, was carefully examined, and the pulp followed to its desired end. One experiment shewed pulp coming out as dry paper in some sixty-five seconds, while an ingenious engineer illustrated the paper machine as a mode of generating electricity. Paper cutting machines were seen and the mechanism explained, and after seeing the roll cutting machines and the stocks of completed paper, the visit came to an end, and after well-deserved thanks to the guides and the manager, the party re-united and set off on the long journey town-wards and tea-wards.

About twenty-four sat down to tea at the "Wells" Restaurant, kindly provided by the courtesy of Mr. Lead, whose unremitting attendance at the lectures and attention to the students has contributed much to the satisfactory condition of the class, and after a most satisfactory tea, votes of thanks to Mr. Hall, Mr. Lead, and Mr. Widdowson, the hon. sec., and a few words from Mr. Clarke, the B. L. agent in Derby, and a silver medallist of the Guild, the Leicester students struggled through another of the snowstorms which had followed the course of the journey and arrived in Leicester about 7-45, having enjoyed a most interesting visit and stored up much information of a practical character.

LIVERPOOL CLASSES.

ON Saturday, February 13th, the Liverpool Litho Technical Class, accompanied by several members of the Typography Class, paid a visit to Messrs. Charlesworth & Co., machine makers, Richmond Hill Ironworks, Oldham. A saloon carriage having been provided, the party, numbering twenty, left Lime-street station at one o'clock, and favoured with fine weather, a pleasant journey was made, arriving in Oldham at 2-30. Mr. Ellis, the firm's representative, conducted the party to the works, where a number of men were working overtime on some important contract work, and the visitors, divided into sections, were conducted through the works by Mr. Charlesworth and assistants. Considerable interest was taken in the departments devoted to the draughtsmen and pattern makers; the patterns belonging to the various sections of the litho machine being shewn and explained. An hour and a half was profitably spent watching the turning lathes, boring, planing, slotting, and shaping machines at work on the various parts of the "Advance" litho machine, and the steady, smooth action of two machines just finished was much admired. The electrical department of this finely equipped establishment was next visited. Two large dynamos were set at work and their mechanism fully explained by the firm's electrical engineer. On leaving the works, the company were favoured with a look through one of the large cotton mills with which the district abounds, the whole process, from the raw material to the finished article, being carefully explained.

Messrs. Charlesworth kindly entertained the company to a substantial tea, after which Mr. Honeyman thanked the firm for their practical sympathy in furthering technical instruction, and for the opportunity afforded of studying the construction of the litho machine. Such visits, he believed, would tend to increase the attention of the printer to the expensive mechanism entrusted to his care. He complimented the firm on the neat and clean aspect throughout the works, and also the care and thoroughness bestowed on every operation. Mr. Gartin, teacher of the typography class, warmly thanked the firm on behalf of his students present. The company arrived in Liverpool at nine o'clock, highly pleased with their instructive outing.

MANCHESTER CLASSES.

A SPECIAL course of six lectures on the "Various Photo-mechanical Process Methods" is being given by Mr. W. T. Wilkinson to letterpress printers, lithographers, &c., at the Manchester Technical School (Whitworth-street branch), on Thursday evenings at half-past seven o'clock. The course commenced on March 10th, and the lectures are accompanied by demonstrations, aided by the electric light, so as to give the students a practical acquaintance with the methods adopted in the chief photo-mechanical processes. The lectures will be free to students of the letterpress or lithographic printing classes, who have been in regular attendance. Fee for non-members of the printing classes: five shillings for the course, or one shilling for each lecture.

Notes and Queries.

[*Through this channel anyone submitting a question upon printing or allied processes can receive an answer, either from our staff of practical technical writers secured for this Journal, or from some reader who may be better qualified to answer "special" questions.*]

IN reply to Mr. A. Simpkin (Smethwick), the difficulty which occurs in printing on the paper sent undoubtedly arises from the ink. You say in your query that you can print with blue ink and bronze ink upon it. Therefore make the black ink—which should not be of the common quality—of the same drying nature as blue or bronze ink, and try that.

2.—The gold blocking on the sample is done by a special press, such as is used in bookbinding for blocking. The design is entirely prepared from a specially made brass block; each design requiring a new block. The metal used is a good Dutch leaf, and no precautions are taken against tarnishing.

3.—A transfer paper composition, which may serve the double purposes of retransferring and copperplate work, should be compounded in the following proportions. Equal quantities of parchment clippings, common glue, and seconds flour; and the same weight of plaster of Paris as all the others combined, thus:—

Parchment clippings	1-oz.
Common glue...	1-oz.
Seconds flour	1-oz.
Plaster of Paris	3-oz.

To prepare the composition, mix the plaster with cold water, stirring and adding water until it forms a creamy liquid which will not set. It will require almost a pint of water. Next mix the flour with cold water to form a thin cold paste, add a little more water, then boil for five minutes. It should not thicken much. To this paste the solution of the plaster is added.

The parchment clippings have to be prepared to form a size which is sufficiently strong to set when cold. The glue is allowed to soak in cold water just sufficient to cover it. The warm parchment size is well stirred into the warm mixture of plaster and flour, the glue solution is finally stirred in and the whole well mixed, then carefully strained through a sieve, keeping it all warm. The paper is coated with the warm composition, a second coating being put on after the first is dry.

IN reply to "Zinc," of Edinburgh, we may say that in using gallic acid in the pure state, there certainly was an error of omission. It is better to prepare the decoction from gall nuts, and on no account omit the phosphoric acid. The gall-nut decoction also contains an alkaline element, which has a beneficial effect upon the zinc. However, an American printer has proved by an accidental occurrence, that to keep zinc plates clean in printing and proving, a weak solution of tea should be constantly used in damping.

IN reply to Mr. H. Hardy, of Bradford, who has a difficulty in rolling up zinc plates with music on, we should think that the remedy lies in using better and stronger ink—no thin varnish in it—and for damping use weak tea solution.

In reply to Mr. H. E. Grantham's query of February 12th, the method of transferring such "autograph" transfers is to damp the back with a *very weak* solution of nitric or oxalic acid, and if the transfers be old, just smear the stone with turpentine, which must evaporate before putting the transfer on.

In reply to the communication of March 6th, all we can say is that our own experience of the use of carbolic acid is widely different, and we cannot help but think that the quantity used has exceeded 1-oz. to 500-ozs. of gum—the amount necessary to prevent fungoid growth. And, as to gum going sour, it has been our constant experience that gum frequently goes sour. Not only is it our experience, but the patent zinc plate manufacturers distinctly warn printers not to use old gum and add acid to it, because it is usually sufficiently acid.

As to rolling up work which has been put by in ordinary ink, much depends upon the quality of the ordinary ink. There are still a few firms up and down the country who use really good inks, which do not so readily oxidise, but the bulk of printers—the cheap printers—use nothing better than 1/6 black, and work put by in such a common material would be difficult to roll up after a few months.

In reply to "Litho," of Accrington, we can safely say that, without actual personal tuition, he will find it a very difficult task to cut writers' pens. If steel be used, then it must be cut into the shape of a fine nib —about the size of Gillot's lithographic pen—and in cutting, it must be accurately balanced on each side in shape. The cutting can only be done with fine scissors—dissecting scissors are excellent. Having cut the shape, the roundness or barrel shape is given to it, by stroking it down lengthwise with a wooden or bone needle. The necessary rotundity having been obtained, the final splitting of the nib is done by cutting with the scissors from the point, to a length of which experience alone can be the best judge. Even the best pen-cutters fail many times, but finally cut a nib which lasts for months. The same process is applicable to quills, except that the quill must be carefully scraped very thin before being cut. Lithographic writers' pens can be obtained at 6d. each, or 5/- per dozen, from C. Elvidge, 3 Freeman's-court, Cheapside, London.

In reply to the second query of "Litho's" letter, the "gloss varnish" referred to in our article on "Dusting and Bronzing" in No. 3, can be obtained from Messrs. Fleming & Co., Caroline-park, Edinburgh.

In reply to a Glasgow correspondent (whose communication has been unfortunately mislaid) we can say that there have been brought into the market gelatine plates of a particular nature, which can be used by any draughtsman to put over a drawing and work up the key or colours upon. The work can be transferred from these plates to stones and used in the ordinary way. We have searched diligently for the particulars of the invention, but have, as yet, failed to discover the address of the agent. If this matter should come under the eye of anyone who remembers the matter, we should be greatly obliged by a reminder.

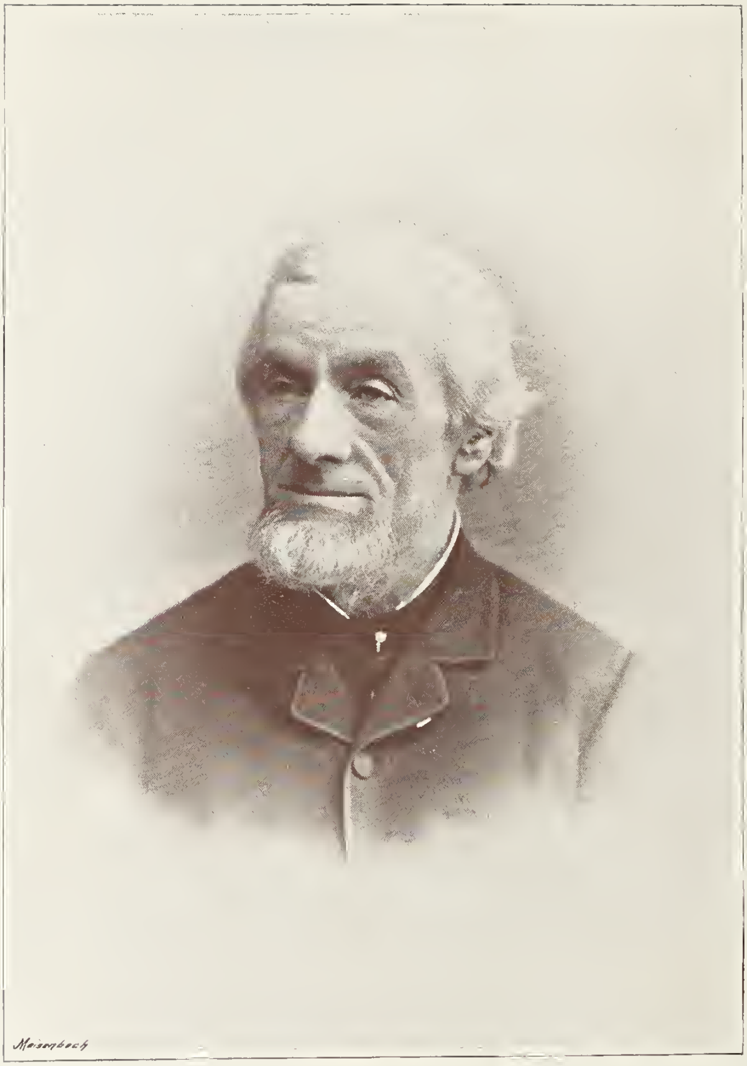
Mr. Fox (Langley) should note that the various questions he asks cover the whole area of lithography, and could not possibly be dealt with in our answers to questions. Our recommendation is to read all the matter which from issue to issue appears in this journal, and thereby gain a better insight than could possibly be given in a few brief answers. (1) The paper may be either transfer paper at 6/- per quire, or foolscap paper, according to the ink used. (3) The ink for transfer paper is 1/6 per stick, and the ink for foolscap 6d. and 1/- per bottle. The writing of a transfer is a very delicate matter, and can only be done respectably by a well-trained writer and draughtsman, who will charge from 2/- to 5/- per hour, according to his speed of writing. The same ink is used for writing upon stone as for drawing on transfer paper. (2) To transfer these writings, the written transfer is damped and put upon the stone and run through. The paper is removed and the stone gummed, dried, and subsequently etched. The rolling up is then proceeded with, and impressions are pulled.

In reply to "A Subscriber," of London, we cannot recommend the use of any ink compounded with an oily matter and a stain, for putting down off-sets. It is our experience that off-sets must be put down with a fine, dry dust, free from grease, and the ink on the off-set sheet must not be thin, or it will soak through the dust, adhere to the stone, and come up in printing. It may be possible, by careful experimenting, to compound an ink with the minimum of varnish necessary for lithographic printing, and the maximum of pigment ground in water, which may prove a substitute for the present dust method of preparing off-sets.

A correspondent from Clapham asks where he can obtain a supply of good grained paper. We can confidently recommend him to try Messrs. Maclure & Macdonald, 2 Bothwell-circus, Glasgow, who supply grained paper in three degrees of grain—No. 1, fine; No. 2, medium; No. 3, coarse—at 30/- per quire of 11 × 17-inch sheets.

A correspondent from Bath asks us how to prepare an ink for printing upon very hard enamelled cards. He will gather a lot of information on this point by perusing the article on "Dusting and Bronzing," in No. 3; in fact, we do not think we can add any better information unless we know what colour of ink is to be used.

A New Ink.—Owing to the discovery of large quantities of a semi-fluid bitumen or maltha, some experimentalists have worked it as a printing ink, and find it not at all unsuitable. It is found in different degrees of density, the thinner kind being used to thin down the thicker ones if necessary. Linseed oil may be used for the same purpose, and like linseed oil, this bitumen may be thickened by boiling. As to its natural qualities, it is not at unlike boiled oil, it is elastic and tough, is indelible, and dries better than many manufactured inks. It distributes freely, and is incomparable for fine work. Its natural hue when dry is a rich dark gold, but can be readily toned to any tint or shade by the addition of coloured pigments.



Alderman William White, J.P.

OUR PORTRAIT GALLERY.

Mr. Alderman William White, J.P., Birmingham.

THE subject of the accompanying portrait was born at Reading seventy-two years ago. For fifty-eight years he has been connected with the printing business, having been apprenticed at the age of fourteen to Mr. R. Parsons, of Reading. After serving his apprenticeship, he spent some three or four years in the service of Mr. W. Wesley, of Burton-on-Trent. From that town Mr. White migrated to its more important neighbour, Birmingham, and there established, in conjunction with the late Mr. Pike, the now celebrated firm of White & Pike. This was in 1848, and since that time the business has slowly, but surely, increased. The first small premises occupied were in Bull-street, but in 1856 these were found to be inadequate, and a move was made into Crooked-lane. In a comparatively short time, however, the space there also proved too limited, and then, in 1872, another move was made, this time into specially-built premises in Moor-street, which were then named and have ever since been known as "Moor-street Printing Works." During the last twenty years, hardly a single year has passed without some necessary addition being made, and last year all the available space in Moor-street having been exhausted, branch works were opened in Park-street, within little more than a stone's-throw of the parent works. In these two buildings, which are as well equipped as any in the country, there are now employed nearly 400 persons, and it is not too much to say that the head of the firm is loved and revered by everyone of them. It is a pleasant feature at Moor-street printing works, and honourable to all concerned, that so many at present employed there have spent the whole of their working lives in the same service. In 1869 Mr. White suffered a great loss in the death of his partner and relative, Mr. Pike, and his place in the firm was shortly afterwards taken by Mr. Frederic Impey, under whose management the business has now for many years been ably and successfully carried on.

In the local typographical technical classes, Mr. White has always taken a great interest. On several occasions he has delivered lectures to the students on subjects connected with the trade, and has also provided opportunities for the members to meet together for social intercourse.

In the midst of a busy commercial life, Mr. White has yet found time to do much work for the public weal. At a very early age he attached himself to the Temperance movement, and soon became known as an earnest advocate of the cause; and in connection with this and the adult school movement, in which he has always taken the deepest interest, there is scarcely a town of any size in England in which his voice has not been heard and his influence felt. Even now, hardly a week passes without visits being made by Mr. White to places more or less distant from home to deliver addresses on these and kindred topics.

More than forty years ago Mr. White assisted in the establishment of the now widely-known Severn-street First-day School, numbering more than 3,000 adult scholars, and became the teacher of one of the classes, a position he still continues to hold, never failing to be in his place at half-past seven o'clock on Sunday mornings to give a welcome to his scholars.

In 1873, Mr. White's municipal career commenced by his election to the Town Council as a representative for St. Mary's Ward, and he has since then by his work on several of the most important committees been able to render very valuable service to the town. In this connection may especially be mentioned his work as chairman of the improvement committee, under whose auspices large tracts of land in the centre of the town were cleared of wretched unsanitary hovels, and long, broad streets were made, which are now lined with fine handsome buildings, worthy of the "best governed city in the world." In 1882, Mr. White was elected Mayor of Birmingham, and filled that onerous and honourable position to the great satisfaction of the community. By the humbler public officials and employés of the corporation, especially, will his mayoralty be remembered, for the hospitality of the Council House was extended to them during that period to a much greater degree than is usually the case. During his mayoralty, Mr. White was elected an Alderman, and in the following year was appointed a Justice of the Peace.

In addition to his municipal offices, Mr. Alderman White has held many others of an important character in connection with the educational and charitable institutions of the city; among which may be mentioned the bailiffship of King Edward's School and of Lench's Trust.

But space forbids more than the very briefest outline of Mr. White's life and work. To-day, in spite of his 72 years, he is as busy as ever, living "laborious days" in the service of the people, with no other thought or desire than that of leaving the world somewhat better than he found it; and that this desire will be most amply fulfilled is attested by the loving gratitude of hundreds of his fellow-citizens, by whom his kindly influence has been felt, and whose lives have been made the brighter and the nobler by his unselfish labours.

Points on Photogravure.

MISCONCEPTION of a compound word, now widely employed to designate one of the higher grades of process engraving, not only exists, but there is also apparent a lack of technical knowledge concerning that specially classified method of pictorial ornamentation. Reference is made to photogravure, a process extensively used at present for reproducing etchings, the linear work of skilled engravers on steel or copper plates, artistic pen or water colour drawings and sepia effects, for the triple purpose of illustrating finely printed volumes, adding to collections in portfolios or cabinets and (in suitable frames) decorating the walls of dwellings, public libraries or museums.

As photography is the basis of this and every other mechanical process by which subjects of portraiture are transferred from the proofs or ordinary impressions of original plates, or direct from an artist's finished drawing, the meaning of the term photogravure becomes self explanatory. It is simply an engraving by chemical process, and with the primal aid of a camera, on the face of prepared metal. The gradations are (1) the negative of the picture; (2) its entire facsimile, line for line, heavy or light, photographed on the surface of bichromatized gelatine, and (3) the printing plate. The latter is obtained by depositing copper on the gelatine in an electric battery.

All illustrative process work has tended in one direction. The object has been to break up the half-tone or shading of the photograph into a series of distinct lines or sharply defined dots. Both chemical and mechanical auxiliaries are employed. As soon as this can be done in a satisfactory manner, all subjects which are within scope of the camera are made available for use in press printing forms, either by means of photo-lithography or by any of the varied methods of photo-engraving. Of these processes the most artistic is undoubtedly photogravure.

In a large measure, plainly written definitions take the place of object lessons and minute verbal explanations. To show the difference between what has been for many years known as copperplate engraving and the photogravure of to-day is therefore essential. The lines of a copperplate are hand engraved or cut into the plate with a bruin, an obliquely ground tool of highly tempered steel. When the picture is completed these lines are filled with ink by means of a dabber. This inking must be carefully done, so as to secure evenness and provide against blotches, which would otherwise appear on the impression.

The residue of ink on the surface of the plate is wiped away with rags or the palm of the plate printer's hand. What is termed plate paper is then laid on the copperplate, and the ink lines are transferred by heavy and uniform pressure. To hold the ink upon the plate in such a manner as to properly represent shadows, a series of cells are formed by cross lining. This makes a "hatching," as it is called, which prevents the ink from being wiped out of the dark parts of the picture when the plate is cleaned up before printing.

A photographic copperplate is really a sheet of copper manufactured on the basis of a gelatine negative. In an electro-magnetic battery the metal can be deposited on gelatine to any thickness desired. The gelatine is bichromatized, and it wrinkles more or less according to the degrees of light acting upon it. After its surface has received the negative the sheet gelatine is swollen by water. It is then ready for the battery. The wrinkling-up property of the gelatine negative is imparted to the copper which is deposited on it, and this becomes the grain in the photogravure, which, like the cross lining on the hand engraved copperplate, holds the ink in the places which are shaded. The result is an intaglio plate, engraved by photography, which can be printed from only by means of a copperplate press.

Another process, generally known as photo-gelatine, has under certain modifications and patent titles the names of heliotype, artotype, indotint, albertype and collotype. The fundamental principle in all is the same. An ounce of gelatine is dissolved in ten ounces of water at a temperature of 100° Fahr. Forty to fifty grains of bichromate of potash and sufficient alcohol to make an easy flowing solution are then added. The bichromatized gelatine is now flowed over a plate of glass or metal and afterwards dried in an oven at a temperature varying from 130° to 140° Fahr. This coated plate is exposed to light under a negative. In its transition the light hardens the gelatine in the shadows, partly hardens it in the half-tones, but has no effect where the opaque parts of the negative keep it from penetrating. After being washed in water, which prevents any further action of light, the photo-gelatine plate is ready for printing.

By preparing this gelatine on a copperplate which has been covered with a thin layer of steel to increase the durability of the metallic surface, the plate can, after the light has acted on it, be placed in an etching bath. The chemical fluid will strike through the gelatine where the light has not acted. It will penetrate less where the gelatine has been slightly hardened by the light, and not have any effect on the parts where the gelatine is altogether hardened. Thus, according to the gradations of the photograph, a printing plate may be obtained which is more or less etched. This process is comparatively rapid and very satisfactory in its press results.

Photogravure has been successfully utilized in Paris for colour application. Fine reproductions of water colours are thus placed on the market at a price which is only a small percentage of the average value of the original pictures. There are even greater possibilities for this advance method of cheap art.

AMERICAN litho. firms are forming a combination to prevent undercutting of prices. There are said to be 700 litho. establishments in the United States.

The "British Lithographer" Examination Papers.—No. 1.

Questions Worked Out.

Elementary.

By W. H. Armitage, . . . Manchester.

Question I.—Explain why a good writing paper can be used for autograph transfers? Is it possible to use it for ordinary transferring purposes; if so, how? (15)

Answer: The reason why a good writing paper is used for autograph transfers, is on account of its hard sized surface, which renders it almost impervious to the ink, and thus makes it the best medium that can be used when autograph work is wanted. Ordinary writing paper cannot be used with any success for litho. transferring purposes. (10)

[Until recently the block impressions in periodicals have been capable of being transferred to stone, by the anastatic process, owing to the greasy nature of the ink and the hard sized surface of the paper. Thus by using the same greasy quality of ink as typographers and keeping it fairly strong, ordinary writing paper may be used for transferring purposes.—Ed.]

Question II.—What should be used to damp the back of an autograph transfer before putting it to stone? Why is it used? Why is it not used for other transfers? (15)

Answer: The solution that should be used to damp autograph transfers with, is a weak solution of [HNO_3 = nitric acid].

The reason it is used is to assist in removing as much of the ink as possible from the paper in the transferring process.

The reason that nitric acid solution is not used to damp other transfers, which may be any of the following, viz.: copper-plate transfers, stone-to-stone transfers, writings, and chalk drawings, etc., is that such transfers are made on papers that have been coated with a composition which serves as a carrier for the ink, and is easily removed from the paper by the use of plain clean water, either hot or cold. (12)

[Autograph transfers may be damped with either nitric or oxalic acid, and its action is to partially release the sizing from the paper fibres, and cause the sizing on the surface to leave the paper somewhat similar to the composition of ordinary transfer paper.—Ed.]

Question III.—How is it that an autograph transfer is transferred by one run through? What is the reason for running other transfers through so many times? (15)

Answer: The reason an autograph transfer is put down with one run through the press only, is on account of the transfer having been made on plain writing paper, and will therefore *not* adhere to the stone, thus compelling the lifting of the transfer after the first run through, to avoid doubling.

The reason for running other transfers through the press so often is, in the first place, to get the job down on the stone firm and solid, and in the second place to avoid blistering of the transfer by the water used during the transferring process. (8)

[If an autograph transfer is only run through once because the paper will not adhere, then why should not all transfers be completely transferred by one run through? The whole process rests on the strength of the grease in the ink, which combines with the stone at once and does not require to lie upon the surface more than one run through. With other transfer inks there is always a large amount of foreign matter with the grease which retards the ready action of the grease and requires longer time to permeate the stone's surface.—Ed.]

Question IV.—What is the nature of gum arabic? Why is chalk added to it to refresh it? How can you tell the difference between gum arabic and gum substitute, or British gum? (20)

Answer: Gum arabic is a compound of calcium, potassium, and arabin, and is of an organic nature.

In substance it is of a hard, brittle nature, and is easily powdered when broken, it is glossy in appearance, it is also of an agreeable taste and is perfectly soluble in water.

Chalk is added to gum when it has gone sour to make up for the loss of calcium which is caused by the growth of a fungus on the surface of the gum, thus reuniting the potassium and arabin, and making the gum fit for use again.

The method of distinguishing gum arabic from British gum or dextrine is as follows:—Place a small quantity of the gum to be tested into a glass tube, and then pour a similar quantity of oxalic acid into the tube also. If the gum be pure a white milky substance will be formed, which is Calcium exalate. If the two fluids do not change in appearance, the substance being tested will be British gum or dextrine, and not gum arabic. (12)

[See article on gum in "Practical Lithography" in No. 3 of this journal.—Ed.]

Question V.—Give a good general composition for a bronzing ink. (10)

Answer: Printing in bronze can be either done by using the gold leaf or by the use of gold in powder.

For bronze work the ink requires to have the following qualities, viz.:—

(1) It must be adhesive.
(2) It must not be too highly coloured.
(3) Must not be too strong, so as not to tear the paper in the process of printing.

A good composition for all ordinary bronze work is a mixture of raw umber and medium varnish.

For "leaf" work, the ink must be much more adhesive than the former, and the following points taken notice of, viz.:—

(1) White wax must always be added to the ink.
(2) The ink must be allowed to dry a little before putting on the metal.

A good composition for "leaf" work is as follows:—

Medium varnish	2 parts.
White wax	1 part.
Venice turps	1 part.
Gold size	small quantity.
Burnt umber	small quantity. (8)

QUESTION VI.—Why are driers not added to black ink? Give the names of six materials which can be used as driers. (10)

ANSWER: The reason driers are not added to black printing ink is that it is in itself a good drier, being solely made up of materials which dry readily, in the form of blue, lamp-black, and varnish.

The following materials can be used as driers, viz.:—

(1) Litharge (an oxide of lead), ground to a paste in a drying oil.

(2) White copperas, or sugar of lead (acetate of lead), ground in a drying oil.

(3) Dry driers and terebene.

(4) Manganese and cobalt benzoates (in use, 3 parts to 1,000 parts of varnish).

(5) Transparent drier: linseed oil and zinc carbonate (equal parts), with 5 per cent. of manganese borate added.

(6) Gold size. (10)

QUESTION VII.—What is the object of damping a transfer in the damp book? State to what extent the damping may be carried for chalk paper, copper-plate transfers, and writings? (15)

ANSWER: The object of damping a transfer in the damp book, is to moisten the composition just sufficient to make it stick to the stone the first time it is run through the press.

Of the three papers, viz., chalk paper, copper-plate paper, and prepared writing paper, the "writing" takes the least damping, next comes the copper-plate paper, and lastly the chalk paper.

In each case the paper should be damped to the extent of becoming tacky, under light pressure of the finger and thumb. (8)

[Why are not all transfers damped in the damp book, for they are all required to become adhesive? The correct solution of why transfers are damped in the damp book, lies in the fact that the composition consists of substances not soluble in cold water, and it therefore requires damping first, before it is put on the warm stone, the warmth of which causes a proper dissolution of the composition. Such a result would not be obtained on a *cold* wet stone. In damping the papers named, the very thin film of composition on the writing papers allows of much more damping than the thicker and softer compositions on the other two. Chalk paper should only just be surface damped, the remainder of the damping can be effected in transferring.—ED.]

QUESTION VIII.—Is there any difference between turpentine and terebene? If so, point out exactly what purposes each will fulfil? (20)

ANSWER: Turpentine and terebene in chemical structure are carbo-hydrates [$C_{10}H_{16}$] of the benzene series.

The difference between them is that turpentine is the natural deposit of such trees as the black, Scotch, and other firs, and terebene is the same substance distilled.

They are of a resinous nature, and the quality of the material depends on the species of trees it has been obtained from.

TURPENTINE.—In lithography it is used to a great extent, and is brought into use in the following ways, viz.:—

(1) As a medium for dissolving greasy compounds and carrying them to the weak parts of any drawing on litho. stone.

(2) As a solvent for softening and removing ink that has set hard on the face of any drawing on stone.

(3) Also for cleaning rollers and slabs, etc., in the case of changing from one colour to another.

(4) Also useful in the mixing and letting down of inks.

TEREBENE.—In lithography it is used for the following purposes, viz.:—

(1) For mixing in and letting down of inks.

(2) For washing out fine work in preference to turpentine. (12)

[Terebene is produced by treating terebenthene with sulphuric acid. Terebenthene is produced by treating turpentine with alkaline carbonate and doubly distilling it. Terebene is more oily and less searching than turpentine. See article on turpentine in "Practical Lithography" in No. 3 of this journal.—ED.]

QUESTION IX.—Name the different kinds of surfaces of the rollers used in printing. How is a glazed roller prepared, what are its uses, and is there any roller made which is a substitute for glazed rollers? (20)

ANSWER: In lithography there are three kinds of rollers in use, viz.:—

(1) Nap roller.

(2) Grained roller.

(3) Glazed roller.

To glaze a roller proceed in the following manner: Roll up the roller in any good drying pigment, such as red lead or flake white ground in medium varnish, and allow it to dry. When dry rub it down with sand-paper to remove any small particles of pigment that may have escaped being thoroughly ground. Repeat this process until the roller attains a good impregnable face. The glazed roller is used to work all bronzing inks and varnish tints.

The roller which should be used as a substitute for the glazed roller is the one under the heading of "grained roller." This roller is made by preparing the smooth or inside of a new skin, instead of the rough or outside. (15)

[Nap rollers are of several degrees of grain. Glazed rollers will not absorb varnish, and are thus much superior to nap rollers for working tints or bronzing inks.—ED.]

QUESTION X.—What are the effects of overloading any ink with turpentine; of leaving turpentine or terebene swimming on a stone; and of breaking in a roller with varnish? (20)

ANSWER: The effect of overloading an ink with turpentine, is that it perfectly destroys the body of the ink, and turns what was a good bodied ink into a thin slimy unmanageable mass, and renders it thoroughly unfit for lithographic printing purposes.

Photo-Print from Chromo-Lithograph.

SUGGESTION FOR CALENDAR.

The effect of leaving turpentine or terebene on the face of a stone, is that they will readily evaporate by absorbing (oxygen) from the air.

The effect of breaking in a new roller with varnish, is that in time the varnish oxidises and sets hard in the grain of the roller, thus completely destroying the roller for the purposes for which a nap roller is used. (12)

[Preserving inks and photo-lithographic transfer inks are thinned with turpentine, and in use, unless allowed to evaporate, cause a hardness in the ink when dry. Too much turpentine has the same effect, but is irremediable. Turpentine by its evaporation leaves a resinous layer upon a stone.—Ed.]

Question XI.—Why does the cylinder of the hand-press frequently refuse to draw the carriage through? What is the proper remedy? (10)

Answer: The cause of the cylinder refusing to draw the carriage through the press, is that the cylinder itself, or the slides on the bottom of the carriage, have become greasy with oil from the sides of the press; or otherwise, water may have got into the cylinder, and thus in either case destroying the friction which exists when both cylinder and carriage are clean.

The proper remedy for the above defect is as follows: Take out the carriage, and thoroughly remove all grease from the slides, by washing with turpentine, and then wipe dry with a clean rag. Next, the cylinder should be thoroughly cleaned with turpentine and wiped thoroughly dry. The carriage should now be put into its place again, and the press will then be ready for use again. (10)

Question XII.—What effect does the moisture of the heated printing room have upon the bare stones, and why? (15)

Answer: The effect the moisture of the heated printing room has upon the bare stones, is the formation of a fine chalky powder on the face of the stone, which is calcium oxide. This reaction is brought about by the excess of carbonic-acid gas in the air, which is due to the close atmosphere. (10)

[See "Practical Lithography" in No. 3 of this journal.—Ed.]

Question XIII.—What is French chalk? For etching, which do you prefer of resin, asphaltum, copal varnish, French chalk, or bronze dust? Why do you give this preference? (10)

French chalk is a variety of talc, and is known as a silicate of magnesia.

Of resin, asphaltum, copal varnish, and French chalk, the *last* named may be classed as the best material for etching purposes.

The reasons for this distinction are as follows, viz.:—

(1) It resists the action of nitric acid far better than any of the above materials.

(2) It is easier and more readily applied than any of the above materials.

(3) On account of its fineness, which enables us to cover the finest work that can be put on the stone, thus protecting the whole of the drawing from the action of acid during the etching process. (10)

Advanced.

By Henry Hendrie, Leith.

Question I.—Describe fully the composition of gum arabic, and shew clearly why it is one of the best materials which can be used for lithographic purposes? Explain how it is that gum arabic goes sour, and what precaution can be taken to prevent souring? (35)

Answer: Gum arabic is a mucilaginous juice which spontaneously exudes from the trunk and branches of the Egyptian thorn *(acacia vera)*. When dry it is almost transparent, and somewhat insipid in taste. It is very soluble in water, with which it forms an adhesive compound. Although quite insoluble in oil or alcohol, it gives to balsams, resins, and fixed oils the power of combining with water. Chemically, it is considered as a salt of calcium (gummate of calcium), sometimes with a considerable proportion of potassium and magnesium. When kept long in solution it is liable to a species of fermentation, becoming sour by the formation of carbonic acid. The addition of a little carbonate of ammonia or chalk will remedy this. But a better plan is to add a small piece of camphor or a few drops of carbolic acid to the solution when first made, which will effectually prevent souring. Notwithstanding this tendency, it is one of the least changeable of all vegetable liquids, and is almost indispensable to the successful practice of the art. The chemical action of the gum upon the stone, by preventing the calcium from exercising its natural affinity for grease, plays a most important part in the process. After the nitric acid has removed a superficial surface or layer of stone, the gummic acid enters into combination with the calcium carbonate, forming an insoluble film of metagummate, somewhat resembling cerosine in its properties—which cannot be removed by subsequent washing with plain water, and by its repellent action towards the fatty acids, of which linseed varnish is composed, renders the art practicable. (25)

Question II.—What is stearine, and for what purposes may it be used? How can a substitute for stearine be readily prepared? (30)

Answer: Stearine in commerce designates a solid mixture of fatty acids (chiefly palmetic and stearic) which is produced from animal fats. It is chemically known as tustearate of glyceryl. The principal use to which it is put lithographically is in the compounding of the various writing and transfer inks and chalks used in the art. Some printers also use it to retard the too quick drying of such colours as bronze blue, &c.

It may be readily prepared by chopping mutton suet (kidney suet is best) and putting it in boiling water. When cold the almost pure stearine will solidify on the surface of the water, from which it may be removed and drained. Many printers consider that for transfer ink it is improved by the addition of one-eighth of ox tallow. (20)

Question III.—How can you discover if Prussian blue, or any other pigment, has been adulterated with starch? (25)

Answer: If starch has been added to Prussian blue or other pigment in any considerable quantity, it may

be discovered by boiling a little of the suspected colour in water. Should it become of a pasty consistency, the presence of starch may be inferred. A more delicate test for minute quantities consists in making a solution of the Prussian blue with the aid of a few grains of oxalic acid. The addition of a few drops of liquor ammonia (·880) will throw down a ferrous precipitate and discharge the colour. The clear liquid must be decanted and boiled. When cold, the addition of a few drops of tincture of iodine will denote the presence of starch by turning a violet blue, more or less deep according to the quantity of starch present. The blue colouring matter will require to be discharged from such colours as blues, dark greens, and purples. The change of tone will be sufficient indication with lighter colours. (25)

QUESTION IV.—Why does a pigment refuse to print evenly on large surfaces? What is added to prevent this, and why is it added? Which colours, by their chemical nature or adulteration, are most likely to present this difficulty? (35)

ANSWER: This difficulty usually arises from working too great a body of pigment for the quantity of varnish. When the impression is pulled the coarser particles are left behind and gradually pile up on the larger surfaces of the job, preventing the proper reception of the ink. It is also caused by colours becoming too rapidly oxidised in working and becoming tough on the rollers, and refusing to receive or distribute freshly added ink properly. In the first case the remedy is to add more varnish, tempered with a little olive oil if necessary. The second case is usually met by adding substances to absorb the oxygen from the linseed varnish, thus retarding drying or oxidation. The hydrocarbons usually chosen for this purpose are stearine, mineral wax, virgin wax, or olive oil. Care must be taken not to add too great a quantity, or the work may never dry at all. The first difficulty usually occurs with heavy or hard gritty colours, such as vermilion, burnt umber, Vandyke brown, emerald green, Chinese and Prussian blue, or with colours adulterated with sulphate of barium. The second with some flake whites, massicot, burnt umber, Prussian, Chinese and bronze blues. (30)

QUESTION V.—Can a nap roller be too "velvety" in the nap? What means should be employed when it is found that the rollers in the machine refuse to ink the work? (20)

ANSWER: The general opinion of experienced printers is that a roller may be too long and velvety in the nap. The grain of such a roller has not "spring" enough to stand up against stiff ink and the nap gets flattened, thus giving it the characteristics of a flat roller. A roller of this description will not ink up a job solidly and at the same time sharply enough for the requirements of first-class lithography. It is also much more liable to become caked and hardened from the ink drying into the pile. When the rollers refuse to ink up the job, the cause most probably is that ink has been allowed to dry in the grain, which has consequently become hard and matted. They should be taken out and well scraped and washed with turpentine. In obstinate cases, a flat piece of pumice stone materially facilitates the cleaning out. If time will allow they should have a mixture of tallow and oil well rubbed in, and be allowed to stand a few days. (15)

QUESTION VI.—What is varnish? From what, and how, is it prepared? Is there any similarity between terebene, turpentine, and varnish? If so, point it out clearly? (30)

ANSWER: Lithographic varnish is a preparation of linseed oil, from which the more volatile constituents have been driven off by heat, leaving a viscid, thick, partially-resinified substance. It is used by the lithographic printer as the medium by which his pigments are formed into inks suitable for application to the stone.

The usual mode of preparing it is to take an iron pot with a tight-fitting lid and half-fill it with the best linseed oil. It is then placed over a clear fire until dense white fumes arise. A piece of lighted paper is held in these fumes until they catch fire. The burning is allowed to continue until about a fourth of its bulk has disappeared, when the flame is extinguished by putting on the lid and removing from the fire. A slice of bread is now put on the top and moved about to remove any greasy scum. A little is dropped on a cold plate and if not of the required consistency it is put on the fire and relighted, testing it from time to time until ready. This is a very dangerous operation, and should not be performed in a shop with a wooden floor. Wet sacks also should be ready in case of accidents.

Terebene, turpentine, and linseed varnish resemble each other, all being of vegetable origin and having each a strong affinity for oxygen. (20)

[Turpentine and terebene dry by evaporation, but leave a residue of resin. Varnish dries by oxidation and forms a resinous mass. All then in drying have the same ultimate effect in hardening and toughening whatever they are in or on.—ED.]

QUESTION VII.—In what way can ordinary air affect the colours of a showbill, and how does foul air act upon them? (35)

ANSWER: There are very few colours which are altogether unaffected by one or other of these agents. A few, such as Prussian blue, are affected by both, this colour possessing the remarkable property of coming and going according as it is exposed to the one influence or the other. By relinquishing oxygen many colours become bleached in ordinary air and light. The vegetable lakes, scarlet, crimson, purple, and yellow lakes, orpiment, geranium scarlet, aniline mauve and magenta, Chinese and Prussian blues, are the principal colours which are affected in this manner. All the lead colours, the majority of chromes, mineral yellow, patent yellow, geranium scarlet, cobalt and indigo blues, and nearly all the copper greens are liable to blacken in impure air, while bronze becomes green or brown, sometimes taking a white metallic sheen in parts. Varnished showcards are less liable to these changes than glazed ones, as the varnish forms a protective skin over the colours. (15)

QUESTION VIII.—What should be the composition of a reliable preserving ink? Why is not ordinary printing ink any use for preserving purposes? (20)

ANSWER: A reliable preserving ink should fulfil two conditions. It should have sufficient non-drying fats or constituents to enable it to resist oxidation for an indefinite time. At the same time, it should have sufficient tenacity to ink up a job firmly and sharply, so that it shall not be found thick and greasy when taken up again. These requirements are fully met in the following composition:—Take stiff varnish 1-oz., tallow 2-oz., Venice turpentine 1-oz., virgin wax 1-oz. These ingredients are melted together, and then 2-oz. stiff black is added gradually and well stirred in. Ordinary printing ink is unsuited for preserving, on account of the tendency of the linseed varnish to absorb oxygen, and become so resinified as to be almost insoluble by turpentine. (20)

QUESTION IX.—What is the difference between lithographic transfer papers and photo-lithographic transfer papers? (25)

ANSWER: The principal points of difference between the two classes of transfer papers may be stated shortly, as that the one is unsensitive, while the other is sensitive to the action of actinic rays. Ordinary lithographic transfer paper is simply coated with a sizing composition, the object being to prevent the absorption of part of the greasy ink, thereby weakening the transfer, and also to interpose a soluble film between the paper and the ink so that it shall all be transferred to the stone. The photo-litho. transfer paper, on the other hand, must be covered with a film of an organic substance, such as gelatine, albumen or gum, capable of being rendered insoluble by one of the various salts of chromium, after exposure to ordinary light. (20)

QUESTION X.—What is the nature of the zinc-plate substitutes now in the market? Is it possible to use them for photo-lithography by any means; if so, how? (20)

ANSWER: In recent years many patents have been taken out for processes whereby a metallic plate may be coated with a film as closely resembling lithographic stone as possible. The one which seems to be most successful in imitating the properties of the stone—although the manipulations more resemble those required for zinc—is known as Mällar's patent. The main features of the process consist in covering a metallic plate with a film of calcium carbonate dissolved in water with excess of carbonic acid. Advantage is taken of the tendency of this carbonic anhydride to unite with metallic oxides, to cause the upper surface of the zinc to enter into chemical union with the under surface of the calcium carbonate, the excess of carbonic acid is then driven off, and when dry, it is ready to go into the hands of the printer.

When required for photo-lithography, a plate a little larger than the job is selected, and prepared as if for an ordinary transfer, only if possible more cleanliness is required. It is then coated with the following sensitive solution:—

Albumen of	1 egg.
Water	10 ozs.
Saturated solution of potassium bichromate	1 oz.

The albumen is first put into a clean bottle with fragments of clean glass, and the water added and well shaken up, the bichromate is now added and also well shaken, and the mixture filtered through cotton wool. After this solution has been flowed over the plate, it must be "whirled" to secure a regular film and prevent crape lines. After exposure, it is covered with a thin coat of photo-litho. transfer ink, and developed in cold water, rubbing gently with a piece of lint. When all the details are well out, allow it to dry, and then gum up and treat as an ordinary transfer, handling it a little more tenderly, as the job is not very firmly attached to the plate. (18)

QUESTION XI.—How do nitric acid, carbolic acid, and alum act upon (1) the stone and (2) the work? What are the main uses of each in lithography? (30)

ANSWER: No other acid so effectually meets the requirements of lithographic printing as nitric acid. The readiness with which it parts with its oxygen, renders it a powerful decomposer of calcium carbonate. In the process of lithography it answers a two-fold purpose. All the writing and transfer inks and the chalks used in the art have a proportion of soap as a constituent, which, if not neutralised, would render them liable to spread when the stone was damped. Nitric acid, by attacking the alkali of this ingredient, destroys the saponaceous character of the ink, rendering the olein and stearine again insoluble in water. A wash of nitric acid, diluted with about sixty times its bulk of water, prepares a chemically clean surface of stone to receive the film of gum which must unite with the calcium to become insolubly fixed. This wash is termed "etching." If allowed to remain too long, or used too strong, the fatty acids which form the job are decomposed and the work destroyed.

Crystalline carbolic acid dissolved in one-tenth of water—the strongest possible solution—has practically no chemical action upon the stone. A clean piece left in this solution for several days showed no indication of chemical action.

By its oily nature it dissolves the protective covering on the lines of the work, and has very slight acid properties on the job. It is only used to preserve gum from souring and to keep fluid transfer ink from turning slimy.

Alum, which is an acid salt of alumina and potash, has practically no chemical action upon the stone, because of the short time which the solution is allowed to remain, although a piece of calcium carbonate, allowed to remain a few days in a saturated solution, will be covered with a film of sulphate of lime. It is used on account of its de-oxygenating action on the insoluble film of gum on the stone. By means of a wash of alum solution, the metagummate is reduced and again becomes soluble in water. After the stone is well washed, a surface suitable for re-transferring or correction is left.

When used too strong, or allowed to remain too long on the stone, its acidulous radical has a destructive action upon the work. It is usually combined with a certain proportion of sal-ammoniac. (25)

QUESTION XII.—What is the internal action set up by mixing flake white with the generality of pigments? (40)

Flake white, by its chemical nature, tends to deprive pigments, which have weak bases, of their oxygen, thus altogether discharging the colour or considerably altering the tone of many other pigments. All the vegetable lakes, except the madder lakes and madder carmines, are bleached by combination with it. Minium is also very fugitive in tint with it, while bronze, Prussian and Chinese blue, have their brilliancy at once impaired by admixture with it. Many lead colours are also injured by it. Silver white, all the chromes, orpiment, king's and patent yellow, are all blackened by the substitution of one element for another, the usual result being the formation of a black sulphuret [sulphide] of lead. Where it has been used in compounding a bronzing ink, the bronze in a short time becomes dull and assumes a somewhat silvery lustre in parts, losing its golden sheen altogether. (30)

Oxide of Zinc in Zincography.

THE action of oxide of zinc in zincography should really be described by an expert chemist, but inasmuch as my observations have been made during long years of actual practice they may be of some value. When nitric acid is applied to a polished zinc plate a black powder forms upon the surface of the plate. This powder, which I call oxide of zinc (really it is nitrate of zinc), and which also forms when light etching is done, must be avoided by the practical zincographer, because it repulses fatty substances. This tendency of the oxide is most plainly visible, if it has not been thoroughly washed off or otherwise removed before transferring a fatty impression. That my observations in this respect are correct is easily proven by the following experiment:—Take a plate out of the etching bath, do not wash it with water, but simply dry by rubbing with blotting paper. A transfer is made upon the plate in the usual way, gummed and rolled up, but soon after the rolling up blank spaces and streaks will appear where the ink has not been retained by the plate; in these plates the oxide of zinc has done its work by preventing the fat adhering to the plate. It is a well-known fact that when transfers upon a zinc plate are washed off with oil of turpentine or gum there is always danger that the impression will not be clean after the plate has been rolled up again; it will appear smeared, and cleaning will do little good. There is good reason for this, and it will always happen when it is attempted to treat a zinc plate like a stone. The combinations formed by chemicals upon the stone are evidently different from those formed upon zinc, and especially gum and turpentine are substances which must be used very cautiously in connection with the latter material. When turpentine is applied to zinc no fat is produced, but as soon as colour is added zinc soap forms in connection with the zinc upon the surface, and a very small quantity of this is sufficient to cause the blurring of the impression, for the zinc soap, *i.e.*, a combination of the fat contained in the colours with the zinc oxide, cannot be removed from the plate, and cleaning or etching spoils or destroys the impression itself. The formation of zinc soap must, therefore, be avoided, and this can be done with the help of gum. In the first place the zinc plate should be gummed at the time the transfer is made, and the gum evenly distributed by means of a tuft of cotton, in order to prevent unequal thickness of the layer of gum or the drying of single drops. After the gum has dried thoroughly the plate is washed with pure oil of turpentine over the dry gum, without the use of water. The latter must be entirely avoided. The superfluous turpentine is then removed with a piece of cloth until the plate appears perfectly clean and no trace of ink remains. Now is the time to add ink to the transfer if it has been previously noticed that the picture upon the zinc did not retain a sufficient quantity of fat. It is only necessary to rub the plate with a soft ball of wadding that has been dipped in transfer ink, and to clean it afterwards with turpentine. After this the plate may be wiped off with a soft sponge, the picture will then appear in pale grey, all lines contain sufficient fatty ink, and the rolling up can now be done without fear of seeing the impressions blurred in some parts; the whole picture will appear clean and bright. The action of the turpentine upon gum should be borne in mind; when washing with the former is executed dry, *i.e.*, upon dry gum, clean plates will always be the result. The washing off of a transfer over dry gum should also always be done in the case of stones, for to wash the moist stone with gum and turpentine, which has heretofore been in general use is, in my opinion, wrong, because the gum etches and produces in many cases, especially in the case of crayons, streaks upon the stones after the washing, which hinder the production of perfect impressions.—F. SANTNER, in *Frieie Künste.*

THE COMPOSITION AND USE OF THE CHROMOGRAPH FOR OBTAINING COPIES OF MANUSCRIPT.—The now numerous methods of repeating copies of manuscript, for private or business purposes, has caused the manufacture of repeating machines to be rather varied. The principle is much the same in all. The best chromograph tablet is prepared with a solution of gelatine in water, to which glycerine is added; the whole mass being thickened with flake white. In commoner forms glue and treacle supplant the gelatine and glycerine. In either case the hot solution is poured into a flat, shallow tin mould, where it sets firm and is retained for use. In operation, a letter is written in aniline ink upon paper. The writing is reversed upon the chromograph, the surface of which should be damp, and by pressure the aniline ink is absorbed by the tablet. From this impression a number of copies can be taken, until the ink is used up out of the composition.

Suggestions.

Initials for Illuminating.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

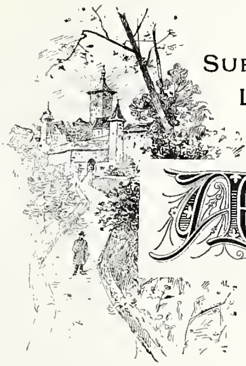
Suggestions.

Initials
· FOR ·
Illuminating.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

·G·C·R·L^TD·

BY CHARLES HARRAP.



CHAPTER III.

SUBSTITUTES FOR LITHOGRAPHIC STONE.

PREPARED ZINC PLATES.

As already alluded to in the introduction, the invention of plates with a chemically-prepared surface to supplant the use of stones has, during the past ten years, been so great as to cause a revolution in the sale of stones and in the manufacture of special printing machinery adapted to printing from plates alone. These inventions have almost simultaneously originated in Germany, England, and America, and the various patent plates have had a very large number of users, especially such as keep a large stock of originals, the plates serving the purpose of keeping originals from which transfers have been taken for printing purposes.

Until recently this has been the main and almost the only manner of utilising this improvement in the business. But, from the plates originally invented, there have arisen patent plates of a simpler character, and there have been introduced readier means of using them, which has resulted in a widespread demand for these economical substitutes for the cumbersome and brittle German stone.

Of these "plate substitutes" there are at least ten which deserve careful attention. They are :—

(1) The Patent Litho. Plates of Messrs. C. & E. Layton.
(2) The Patent Metallographic Plates.
(3) Patent Lithographic Zinc Plates of Herr O. Kindermann.
(4) Salcher and Schwertochlag's Patent (1887).
(5) Wezel and Naumann's Patent (Leipzig).
(6) The American Patent Litho. Plate Co.'s Plates.
(7) Recent German Patent (chloride surface).
(8) Aluminium Surfaced Plates (American patent).
(9) Zinc prepared with alum (A. T. Moses, Manchester).
(10) Patent Lithographic Plates of the Zincplate Company, Limited, Hull.

The foregoing list will at once shew the extent to which these inventions have been pushed, and the ground which it is now intended to cover.

The last five plates in the list are those which are of more recent date, and may be considered the best now in the market. The tenth has certainly many examples of excellent impressions, notably a supplement which appeared in No. 2 of THE BRITISH LITHOGRAPHER, which prove that work on the plates can be printed with equal, if not greater perfection than from stone. And it cannot be denied that these plates allow of much longer "runs" than stones have been known to yield, the impressions, after 8,000 or 10,000 runs being very little, if at all, inferior to the first 100. Such a claim cannot be upheld for work on stone, and the advantages of these plates put them in a position demanding the first consideration.

I.—THE PATENT LITHOGRAPHIC ZINC PLATES OF THE ZINCPLATE COMPANY, LIMITED, HULL.

These plates are prepared in a different and more simple manner than anything heretofore produced, and the simplicity of their manufacture greatly increases their commercial value, for it places in the hands of the printer a material which is so slightly removed from stone in its treatment that difficulties in preparation, transferring, and printing, are reduced to a minimum. It is quite unreasonable to suppose that plates of this nature are capable of exactly the *same* treatment as stone, but the treatment consists of the same number of processes as for stone, and the processes are conducted in much the same way. Just as a printer has to learn the use of acids and gums in lithographic printing, so has he to learn the use of the etching and preparing solutions manufactured for these plates.

The preparation of these plates consists in a treatment of the zinc, by which it is rendered susceptible of taking a further chemical mixture, which adds to it the final properties that make it as nearly like stone as it is possible by chemical means. What the chemical preparation is, is kept as the secret of the patent, but much valuable information on this point may be gained from the subsequent descriptions of other patent plates.

The plates thus prepared are in a better condition to stand rough usage than most others, from which the surface is more or less liable to crack or peel off, owing to the superficial character of the prepared films upon their surfaces.

The plates are not calculated to stand continual usage without going through the initial stages of preparation occasionally, but a large amount of work can be had out of them before the plates are reduced to such a necessity. For a length of time the plates can be cleaned and prepared for new work by the printer, and not until a plate has been so re-prepared at least half a dozen times, is it necessary to return them to the patentees to be again chemically prepared. Of course the cost of carriage and re-preparing are items of consideration, but when it is shewn that six imperial 8vo plates can be re-prepared for 1s. 6d., exclusive of carriage, it cannot be denied that this cost will be less than polishing thirty-six stones of the same dimensions. A re-prepared plate is expected to

stand cleaning off at least six times, so that one preparation represents six ordinary preparations by polishing stones.

The method of cleaning the plates is easily accomplished, and may be summed up in four stages, thus:—

(1) Wash out thoroughly with good turpentine, and dry the plate.

(2) Cover the plate with the solution No. 1 as supplied by the patentees, and at the same time with a rag or sponge dipped in the solution, rub all the work over well. After a few minutes rubbing the plate is well washed with clean water and drained off.

(3) Cover the plate entirely with the solution No. 2 supplied by the patentees, and allow it to remain until it has entirely destroyed any greasy matter upon the plate, which is shewn by it not being repulsed from any portion of the old work. The plate is then *thoroughly* washed with clean water and dried.

(4) Cover the plate evenly, using a sponge or soft brush kept exclusively for this purpose, with a thin film of the coating composition supplied by the patentees. When dry, the plate is ready for new work. Should a white chalky deposit appear on the surface dust it off with a clean linen rag.

After thus cleaning and re-preparing, much of the old work may still be visible as it frequently is on stones, but there is no necessity for anxiety, as the old work has never been known to interfere in any way with the new.

If it is intended to use plates to any extent it is far more economical to use the iron beds, supplied by the patentees, for fixing the plates for machine work. The beds are so constructed that narrow strips of plate, long enough to overlap the front and back edges of the bed, can be used to secure plates of all sizes smaller than the bed is made for. In that way each machine ean be fitted with a bed which will not require "lifting" for each new plate put in. Of course handy methods will suggest themselves for using the plates, with their edges bent down over wooden blocks or lithographic stones, and by partially running the plate through so that the cylinder will hold the gripper edge firmly, the back of the plate can be adjusted with blocks. The plate is then run through to the opposite edge, and when thus holding it firmly the whole arrangement of blocks and stone is screwed up tightly ready for printing. Such a course is applicable to work in one printing only, but for chromo-lithography it can scarcely be relied upon. In the latter case a bed must be devised or purchased which will render it impossible for the plate to move during printing.

In printing there are a few points to which special attention must be drawn, and they may be tabulated as follows:—

(*a*) Before fixing a plate, thoroughly dust the back of the plate and the bed on which it is to be fixed, so as to prevent the presence of gritty particles and to avoid buckling during the course of printing.

(*b*) Unless the paper be soft or too common, or the work too heavy, it is better to use a good ink thinned with good thin and middle varnish in equal quantities.

(*c*) In selecting coloured inks, avoid the cheap ones, and select only those which are not acid in their action.

(*d*) Less pressure is needed than for stone.

(*e*) If the plate becomes dirty all over, it should be rolled up by hand and receive a resin or French-chalk etch, using the etching solution supplied by the patentees, strengthened, if necessary, by the addition of phosphoric acid.

(*f*) To keep the edges clean use a piece of flannel dipped in gum, or in the etching solution.

(*g*) Should the edges, or any part, wear bright in printing, wash the parts perfectly clean, and sponge them over when dry with the coating composition. When this is dry it requires gumming and drying, then the printing can proceed.

(*h*) Before leaving the plate in the machine for any length of time, care should be taken to roll it up well in retransfer ink, clean it up, and gum it with good gum.

(*i*) To cure dirtiness or scumminess on a plate, when the work is sufficiently strong to stand it, vinegar and gum in small quantities may be added to the damping water.

The foregoing remarks are such as touch upon the general use of the plates, and serve to show that the differences, if any, are but slight as compared with stone work. It may have already been gathered from the details that the plates do not require the same severity of treatment that is given to stone, and this will be borne out by subsequent matter.

To Transfer and Prepare for Proving.

The plate may be "set" upon a couple of sheets of paper on a perfectly level stone, or by wetting a stone and placing the plate on it. The water will dry up occasionally and has to be replenished.

Transferring is accomplished exactly as for stone, except that the plate being so thin could not be kept warm as stones are, unless the stone underneath or bed is first warmed, thus keeping the plate warm.

Having washed off the transfer paper and composition, the plate is in the same position as if a draughtsman had executed a drawing upon it. It should be fanned dry and gummed evenly and thinly. The work should then be rolled up with a good roller. If it be rubbed up, a sponge or soft rag may be used, but it is better to roll it up. The work is then dusted with French chalk, and etched with the etching solution until quite sharp and clear. To clear away scum, the etching solution may be strengthened with a little gum and phosphoric acid. This strong solution may be used with the "stump" in such cases as the "acid stump" would be used on stone, and the final clearing of the work may be performed with the scraper. Gum up the plate and it is ready for proving.

To make Alterations or Additions to Work.

The method adopted is precisely as already described in the four stages for cleaning and re-preparing the plates, only that the process is performed upon the parts of the plate affected by the alteration, whilst the remainder of the work is kept under gum. There is just one slight difference, and that is, before solution No. 2 is applied, the plate may be slightly warmed before a fire. It should however be borne in mind, that such alterations can only be executed *after* the work has been rolled up, and although the same process is applicable to chalk work on grained plates,

yet the draughtsman in any case is precluded from using it until the work has been rolled up.

To put down Off-sets.

Pull the impression from the key in good stiff ink, and dust with well sifted (through muslin), dry, red chalk. Care should be taken that the chalk is not greasy, and that both the chalk and paper are quite dry. If the ink be too thin, and the impression pulled full, the ink will get through the chalk and cause the off-set to adhere and come up in printing.

The dusted impression should be run through with an even moderate pressure, on a dry plate. If that does not give a distinct off-set, it should be at once washed off with clean water, and a second dusted impression run through quickly on the plate slightly damped. Turpentine should not, on any account, be used for putting off-sets down.

To Preserve Plates.

The work should be cleaned out just as when preparing a plate for printing colour, by slightly damping the plate, then sprinkling a few drops of turpentine on it. With a soft rag, remove the heavy masses of ink, and with another rag finally clear the ink from the work. The plate should then be rolled up in a nice preserving ink, made by mixing equal quantities of retransfer and printing inks, after which it is etched, cleaned, dried, and gummed up evenly and smoothly. Before the gum is dry, put a sheet of clean paper on, and in so doing exclude all air. A more effectual means of excluding the air is to gum a sheet of paper, and put it on the plate carefully. Plates can thus be stored in wrappers, with an impression of the work upon them, in a perfectly dry place, and kept any length of time.

To Use the Whole of a Plate.

If the work only covers a portion of a plate, the remainder of the plate may be used from time to time for other work, and does not require the preparation already described for re-preparing a plate. It is necessary to wash the parts perfectly clear of gum with water, then go over the bare plate with a very weak solution of acetic acid. The plate is then washed with clean water, and dried. Finally a thin film of the coating composition is brushed on, and allowed to dry. The plate is then ready for use.

To Restore Worn-out Work.

This is effected the same as on stone, by using a mixture of retransfer ink and turpentine, or terebine, rubbed on with a soft rag, taking care that plenty of thick gum is kept on the plate.

Grained Plates.

Not only are these patent plates manufactured for the ordinary purposes as substitutes for polished stones, but at a slightly increased cost, grained plates are made. These plates are manufactured in three degrees of grain, viz.: "40" (coarse), "60" (medium), "80" (fine), and in treatment, vary but little from plain plates. In printing, care must be taken to keep the pressure as light as possible, compatible with good impressions. Under heavy pressure the tips of the grain are destroyed, and the speed of the machine should not exceed 500 runs per hour.

To Prepare Grained Plates for Proving.

The drawing, after being received from the draughtsman, is gummed evenly and thinly with fresh gum, to which a few drops of strong phosphoric acid have been added. If old sour gum be used it will be sufficiently acid without the phosphoric acid. This is allowed to dry. The gum is then carefully washed off, and the work rolled up with a good roller. Impressions may be taken occasionally, to assist the roller in removing the chalk. If the work is strong, it may be washed out with turpentine before rolling up. When the rolling up has produced a satisfactory impression, the work should be dusted with French chalk, and etched with a mixture of:—

The etching solution	1-oz.
Thick gum	1-oz.
Strong phosphoric acid ...	10 to 15 drops.

This is allowed to dry upon the plate, or if not dry in two or three minutes, it is washed off and the plate is dried. The plate is gummed up evenly and thinly and dried, and is then ready for proving.

[*To be continued.*]

Correspondence.

To the Editor of The British Lithographer.

DEAR SIR,—The articles on "Practical Lithography" in the B. L. give scientific explanations of many of the actions of substances used by the lithographer, and their value will be much appreciated by those most directly interested. But on page 8 of No. 3 it is stated that "it is not until there is an excess of HNO_3 upon the stone that its etching action upon the stone itself can proceed." I quite agree with the writer that it is a mistake to use bronze powder as a resist, though there are other metals besides copper in it. Yet, if a solution of nitric acid is poured on a stone the work upon which has been dusted over with bronze, it will be seen to attack the stone equally with the resist, and at the same time.

Referring to oxalic acid on page 9, it is said that "in its action upon stone it resembles citric acid, giving an insoluble oxalate of lime, which is removed by plenty of water and a sponge. If citric acid did not exist, then oxalic acid would be a valuable substitute."

I do not think it is practicable to wash off the whole of the oxalate of lime with water, and therefore it would not be a valuable substitute for citric acid in the preparation of a stone to receive new work, as it is well known that wherever oxalic acid has touched the face of a stone it has to be removed either by polishing, scraping, or by chemical means before new work will hold upon that part of the stone. Its action as an acid is therefore peculiar, but, I think, somewhat analogous to H_2SO_4, which dissolves the face of the stone, forming gypsum [$CaSO_4$] only part of which is washed away with water, the remainder forming a film on the face of the stone. Yours truly,

S. D. H.

[*With the view of making its contents more thoroughly useful, the Editors of the B.L. will be glad to invite discussion and suggestions on the Technical papers appearing in its columns.*]

Photo-Etching upon Copper Plates.

By Victor A. L. Corbould.

Undoubtedly one of the finest reproduction processes which we have, which is of photographic origin, is that of heliogravure, or, as it is more popularly called, photogravure. It seems that some modern writers make the distinction between the two names to be as follows: photogravure or half-tone intaglio plates, whilst they reserve the term heliogravure for surface printing blocks. In this article I intend to treat only of the former.

The process is roughly this: A relief negative in gelatine is placed in contact with a polished copper plate which has been previously coated with a "ground," the object of the ground being that the copper shall be in part protected from the biting fluids used in the next part of the process, an uneven surface or "tooth" being thus obtained which holds the ink in printing. The plate is then placed in an etching bath, and this acts by penetrating the film and thus acting upon the copper in inverse ratio to the proportion of gelatine relief on the surface, thus the unprotected parts of the copper are first attacked, then as the fluid penetrates first the half tones of the negatives, and finally the densest portions, they are etched in turn. The etching being completed, the relief negative is cleared off the surface of the copper, cleaned, when the image is found to be bitten into the copper to a slight extent, sufficient to hold a small quantity of ink, which is applied with a dabber, and then partially wiped off, leaving the portions representing the high lights of the picture as clean copper surfaces.

The details of the process are these:—A good negative having been obtained, a transparency is made by any process which is most convenient, wet plate or carbon giving the best results; from this transparency a negative is made in carbon; standard brown of the Autotype Company is the best colour to use. The copper plate is next "grained." This is best done with resin, either put on in solution from a fine spray, or in a dusting box, which is a box containing finely-powdered resin. This resin is agitated, and whilst the interior of the box is filled with an atmosphere of fine resin dust, the plate is inserted face upwards, and this dust is allowed to settle on its polished surface. The plate is then heated to fix the resin to the plate; the resin is allowed *just* and only *just* to melt, which point is known by a dark wave passing over the film as viewed by the reflected light of a candle or gas jet. Presuming the grains of resin to be spherical, it will be seen that the desired result is that the spheres shall be only melted on the surface tangential to the copper, thus protecting the copper at a point, but having an interspace between it and the tangent point of the next granule. This having been done, the plate is cooled, and the carbon negative previously made is removed from the printing frame and soaked in water until the film straightens, after the first curling, it is then placed in contact with the grained copper plate with a squeegee; after having been allowed to partially dry under pressure, it is developed as usual with hot water, then soaked in alum, 1 in 20, for about twenty minutes, rinsed, and allowed to dry *horizontally*. The edges and back of the plate are then protected with a resist varnish, which should be a quick drying one. (I use Bates' black and benzole, equal parts.) When this is dry, the plate is ready for etching. Perchloride of iron is the best biting fluid to use. It is best to use this of different strengths. I use seventy-five per cent., fifty per cent., thirty per cent., and twenty per cent. baths; and here is an apparent anomaly—the strongest bath has the least action, for it so tans the gelatine of the relief or temporary image that it allows no mordant to reach the copper, but as the latter becomes in the future baths more diluted, and the gelatine swells more, the mordant penetrates, and so etches the copper.

The biting being finished, the temporary image is cleaned off with hot solution of washing soda, which at the same time prevents further action of the perchloride by converting it into carbonate. The plate is then cleaned with French chalk and methyl alcohol, which removes the copper salts formed during biting, and at the same time cleans off the resist varnish. The plate is now ready for pulling a print from. But it must be remembered that every pull detracts from the quality of the plate, as the relief is but slight, and the copper soft. If many prints are desired, the plate ought to have an electro deposit of steel put upon it. A pull can now be taken as follows:—The plate after having been warmed and inked with a thin ink which is dense in colour, and the surface partially cleaned with the palm of the hand, leaving the ink only in the half tones and shadows, whilst the high lights are quite cleaned, is warmed again, but allowed to get *cold* before placing on the bed of the press, on which is a sheet of plate paper. A sheet of India paper having been previously damped is then placed upon the plate, and the three or four layers of blanketing are superposed and the plate passed through the press; when the print is practically finished, the glaze given by passing under such pressure is got rid of by soaking the prints for a day or two in a dish of clean water.

The printing is undoubtedly the most difficult part of the process, and I have not by any means satisfied myself with my own results, but I put this down partially to trying to make shift for a copper-plate press with a roller burnisher, on which I have very great difficulty in getting the pressure even.

The extensive collection of paintings which the superb discrimination of Mr. Prang, the eminent American art lithographer, has enabled him to gather together for reproduction, was sold in New York on the 16th, 17th, and 18th of February. All schools of American art were represented, and the water-colours comprised a "complete exposition of the progress and development of the American water-colour art, illustrated by the ablest work of the ablest masters of *aquarelle*." Many of the pictures were painted for Mr. Prang by prominent artists. There are 441 pictures announced in the catalogue, which comprises some 180 pages, handsomely printed upon coated paper, with many engravings.

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Lithographic Technical Teachers.

Samuel Dan Hall.

Samuel Dan Hall was born on the 10th May, 1852, in Derby, of Nottinghamshire parents. In early life he encountered many of the vicissitudes that the poor have to struggle through, and what education he obtained was at the national school. Though making satisfactory progress, he longed to be at work, and at the early age of eight-and-a-half years he entered upon his first situation, with Messrs. T. Richardson and Sons, printers and publishers, where for two years he was employed in the bookbinding and finishing rooms. Messrs. Holmes, coach builders, were his next employers. Here his occupation was varied — screwing bolts, turning bolt heads on a small lathe, and working a steam saw. Whilst so engaged he thought he had found what should be the work of his life, that of an engineer. Circumstances arose that caused him to leave, and he next obtained a situation to damp stones in the litho. room of Messrs. Bemrose & Sons, three weeks before his eleventh birthday. There, watching the movements of the printing machines, and spending his Saturday afternoons, as he frequently did, with the engine-driver, his interest in mechanics was increased, and though at the age of fourteen he was entrusted with the working of a press with another boy to damp stone, he did not think he should settle down as a printer. But the engineering firm with which his father was arranging to apprentice him failed, and Mr. Wm. Bemrose pressed young Hall to be bound as an apprentice, eventually succeeding in obtaining his father's consent.

"Never," says Mr. Hall, "shall I forget the feeling I had when, after having signed the indenture, the foreman (a man in the truest sense of the word, Mr. George Bailey) said, 'Well, Sam, you had now better go and hang yourself.' (He was making transfer ink at the time and inhaling the pleasant (?) fumes.) But I determined that now, being 'bound,' I would do the best I could to master the whole of my business. The firm encouraged me by giving me opportunities such as can only be obtained in a jobbing shop where all classes of work are done. At the age of 18 I began to work on a litho. machine (one of the earliest, Huguet's, of Paris).

"About this time (1870) a trade journal, *The Lithographer*, was started in London. I became a subscriber, and have followed it through all its changes of title. This journal considerably enlarged my views on matters pertaining to the trade, and I studied everything I could lay hold of, including *Cassell's Technical Educator*."

SAMUEL D. HALL,
Technical Lecturer to the Derby and Leicester Classes in Lithography.

His early training having taught him the value of interchange of thought on all matters pertaining to the welfare of men, morally, physically, and socially, it was not difficult to persuade Mr. Hall that a trade union conducted upon broad lines was of value not only to workmen but also to employers as a medium through which the best interests of all could be ventilated and advanced, and when a society was established in January, 1877, he was elected President, taking up the Secretaryship of the branch soon after the Amalgamated Society of Lithographic Printers was formed, and being elected to represent the local society in the conferences at Bradford, Liverpool, and Glasgow, only resigning his official position when he was appointed foreman of Messrs. Bemrose & Sons' litho. establishment, upwards of three years ago.

Meanwhile Mr. Hall entered the School of Science, and obtained certificates in theoretical and practical chemistry in 1884, and also in 1885. In the latter year, at the invitation of Mr. William Bemrose, he consented to take charge of the Lithographic Technical Class then being formed, and found it an easy matter to satisfy the requirements of the City and Guilds of London Institute, who readily granted the teacher's certificate. In his new capacity Mr. Hall was remarkably successful. The classes were continued three sessions, and three medals—one silver (highest award) and two bronze—were won by pupils; while an illuminated address and a magnificent album containing the portraits of the students were given by them to their teacher in recognition of his services.

The classes having for the time used up all the available teachable material in Derby, they were discontinued; but in consequence of the influx of new students work has been resumed this session, in the Derby Municipal School, the use of which was granted by the Corporation. When the formation of a class at Leicester was determined on, Mr. Hall was invited to take charge, and with his usual readiness in the cause of progress at once consented, commencing his lectures at the Ellis Technical School on November 4th, to the largest class of lithographic students in the kingdom.

Outside of business, Mr. Hall is an earnest worker in connexion with local institutions. He has been a member of the Committee of the Infirmary Saturday Fund for six years, and a Governor of the Infirmary for four years, and for twenty-one years has been first teacher and then superintendent of the Unitarian Sunday School in Derby. Quiet and unassuming in manner, earnest in every work aiming at progress, Mr. Hall has a host of warm friends, and is constantly adding to the number.

Printing upon Hard-Faced "Boards."

THE USE OF FLOUR PASTE.

In printing upon any hard-faced paper or card, the printer always experiences difficulties. Frequently such printing requires to be in broad effects: large masses of ink have to be put on, and, as is often the case, the ink must be sufficiently powerful to obliterate the colour of the card. To do this, it is necessary to use an ink very slightly reduced, and to obtain that, only a very small amount of varnish must be used. It is very common to add a small amount of strong varnish. Strong varnish is all very well in some cases, where there is a sufficient body of paper to absorb it; but on a hard smooth-faced paper, it stands upon the surface and dries there as a layer of resin, liable to crack and dust off. This method has often resulted in being able to wipe the work almost clear off the sheet a day after printing. What is wanted is some substance which will adhere firmly to the hard-faced paper and keep a firm hold of the pigment. Common flour paste is such a material. In paste are combined many useful qualities. Articles pasted upon glass adhere very firmly, proving that paste has the adhesive power necessary for this class of printing. Paste, when used in an ink, causes a double combination between the pigment and the paper, and being protected by the presence of varnish, withstands drying to that extent which would cause it to dust off. It may be surmised that paste having a tendency to dry white will affect the colour, but this is not so; the small quantity used will never be seen when dry. There is not the least doubt about the success of this addition to printing ink. At one time paste always formed an important constituent of bronzing or dusting inks, and its use on hard-faced cards, although known by many and practised by a few, is unknown to the vast majority of the present generation of printers.

It is not intended that paste should form any large proportion of the ink. After having added a small quantity of medium varnish, then add, little by little, a small quantity of paste until it can be gauged by experience whether the ink will wipe off. Having previously printed work which has wiped off, the printer can readily tell by inspection or rough test when the ink has the necessary consistency for good and easy printing and drying.

New Process of Colour Printing.

A method has just been patented in the United States, covering an improvement in colour printing. The process is effected in such a way that the well-known character of water-colour painting is closely imitated, while the ordinary lithographic stones can be employed for this purpose. The invention consists of the following steps: (1) producing the different tints by means of brush and lithographic inks on the thin transparent sheets of celluloid; (2) transferring the tints from the sheets of celluloid to the lithographic stones; and finally, printing from the stones in different colours, so as to produce the original painting.

In carrying out the invention thin sheets of celluloid are placed one after the other over the water-colour or other painting that is to be reproduced in colours, care being taken that the proper register of the sheets with the original painting is retained. One sheet of celluloid is used for each colour of the original painting. While the sheet is placed in position on the original painting, the special tint is produced on the same by means of a brush and lithographic ink, so that a so-called "wash-tint" is produced, the different portions of which are graduated in proportion to the depth of colour in the original painting. When as many sheets as there are colours in the original painting are thus produced, the wash-tints on the same are transferred from the celluloid sheets to as many different lithographic stones. The surface of the stones is grained preparatory to receiving the wash-tints on the transfer-sheets.

After the transfer of the wash-tints is made, the stones are coated with a layer of a solution of gum, and after drying washed off, the stones being then rolled up in the usual manner with transfer-ink. The stones are next "etched" with gum and acid like a crayon-drawing. The wash-tints are broken up into small dots by the raised portions of the grain, so that the tints on the stone are an exact reproduction in grain of the wash-tints on the sheets — they being denser at the heavier parts and thinner at the lighter parts. The different colours are then printed from the stones until a picture in colours is obtained in which the characteristic features and tints of the original painting are faithfully reproduced. In addition to the wash-tints employed, graining or stipple effects may be added to the sheets of celluloid and then transferred to the stones, or they may be added on the stones in the usual manner.—*Paper and Press.*

Half-Tone Lithography and the Zinc-Block Process.

Its Position Twenty-seven Years Ago.

Messrs. E. & J. Bullock's Patent. No. 2954. Nov. 17, 1865.

The following specification will clearly show that although the now famous zinc-block processes have only become popularly used during the last eight or ten years, yet the principle and mode of their preparation were well understood and practised over a quarter of a century ago.

Questions are often asked as to the bearing of the numerous patents taken out within the last few years for so-called improvements in photo-zincography and photo-lithography. The best reply to these is the following specification, which will well repay perusal :—

" We, Edward Bullock and James Bullock, both of Leamington, in the County of Warwick, do hereby declare the nature of the said invention for ' Improvements in the application of Photography to the obtaining of printed proofs or impressions or engravings,' to be as follows :—

" In order to produce a photograph from which printed proofs or impressions can be taken, either directly or not, as from a stone or zinc plate, exhibiting half tones and graduated shading similar to an engraving, we reticulate or break up the surface into very fine and minute lines or dots. This may be done in several ways at various stages of the process. Thus an ordinary plain photographic negative may be taken in the usual way, and a picture produced therefrom having its surface reticulated or broken up into lines or dots, as aforesaid, by placing any ordinary fine fabric, as muslin, gauze, or net, between the negative and the sensitized paper or other surface intended to receive the picture, the same being previously prepared by any of the bichromate and ink processes known in the trade. The result will be a positive picture or copy, bearing on its surface the reticulations or markings of the fabric interposed as aforesaid. This copy with the reticulations may be transferred to a stone or zinc plate, and any number of impressions may be printed off, each bearing the markings or reticulations of the interposed fabric with the lights and shades according to the original negative, and bearing all the appearance of an engraving. As we have already stated, such reticulated negatives may be produced in other ways; thus ground glass previously rubbed in with dark-coloured paint or other suitable colouring matter may be employed for the original negatives, or may be interposed between the negative and the sensitized paper or other surface in the place of the fabric mentioned above.

" Another process would be the interposition of a fabric such as net or gauze between the camera and the object to be photographed; or copies of reticulated or granulated structures or fabrics upon any transparent medium, such as glass, talc, or gelatine, may be interposed between the negative and the sensitized surface, or placed before the prepared plate during exposure in the camera; or the negative plate may be first exposed for a few seconds to the granulated or reticulated surface, and afterwards to the object to be photographed.

"Another process whereby such reticulated negatives may be produced is the placing of the copy of a reticulated or granulated surface face to face with any ordinary negative, and copy both together through the light, thus producing a transparency from which another copy may be taken, a print from which will have the reticulated or granulated appearance afore mentioned.

"Another method is the superposition of the granulated material or negative copy of such material upon the prepared surface, and printing the image by the aid of the solar camera on such surface through the reticulated medium.

" There are several other processes whereby such reticulated negatives or prints may be produced, but in every case it is necessary that the plate or impression from which the printed proofs or copies are ultimately to be taken should be so reticulated or marked on its surface. Such so reticulated negatives, or impressions from them, may be transferred to a lithographic stone or zinc plate, or they may be transferred by the ordinary processes to a steel or copper plate and etched, from which plate engravings may be obtained.

"In order to produce a photograph from which printed proofs or impressions can be taken, either directly or not, as from a stone or zinc plate, exhibiting half tones and graduated shading similar to an engraving or lithograph, we reticulate or break up the surface into very fine and minute lines or dots. One process is to reticulate the negatives, which may be done by placing the copy of a reticulated or granulated surface face to face with any ordinary negative, and copying both together through the light, thus producing a transparency from which a negative must be taken, a print from which, upon paper prepared by any of the bichromate and ink processes known in the trade, will have the reticulated or granulated appearance afore mentioned. This copy with the reticulations may be transferred to a stone or zinc plate, and any number of impressions may be printed off, each bearing the markings or reticulations of the interposed copy with the lights and shades according to the original negative, and bearing all the appearance of an engraving or lithograph.

"Another process is to use a transfer paper, prepared in the manner about to be described, with granulations or reticulations already imprinted or otherwise

impressed or placed upon it. This paper may be used whether the impression be a lithograph, a zincograph, an impression from an electrotype, or from an engraved or etched plate. This paper is prepared by coating paper, which may be either ordinary or photographic paper, with gelatine, gum, isinglass, albumen, glue, sugar, starch, or other similar substance having a glutinous nature, or it may be coated with a combination of these substances. This part of the process may or may not be conducted in connection with bichromate of potash, or bichromate of ammonia, or other chemical having the same characteristics. Upon the paper so prepared is printed a granulated or reticulated pattern of any character, composed of dots or lines in ink of any kind or colour having the power partially or completely, according to requirement, of preventing the light acting on the paper beneath. In this case the specks of ink themselves form a medium, and by their aid excessive contrasts are avoided and half tones secured. Such picture when so obtained is passed to a lithographic stone or zinc plate, and a printed proof produced therefrom; by the aid of chromo-lithography coloured proofs may be produced.

"We claim as our invention—

"Firstly, reticulated negatives having the appearance of copies of engravings and lithographs or etchings produced in the manner above described.

"Secondly, we claim a photographic paper prepared as herein-before described.

"Thirdly, we claim in general the 'Improvements in the application of photography to the obtaining of printed proofs or impressions or engravings,' herein-before set forward and described in this our specification."

Another Substitute for Stone.

Printing from Glass Plates.

Mr. F. Winterhoff, Falcon Works, Suffield-road, South Tottenham, London, has patented a process of printing from glass plates, the simplicity and cheapness of which should bring it into favour with a large majority of printers. The patent lies in the preparation of glass for this purpose, and consists in putting on the glass a composition which will readily receive a lithographic transfer. At first sight, the use of glass seems incredible, but when hundreds upon hundreds of examples of the work can be seen, and the actual printing process has been closely witnessed, there should not remain a shade of doubt as to its general applicability. The patentee has supplied us with a number of samples of printing from these plates, and they all shew that prints of a clean, sharp character, full of depth, and not unlike stone engravings, can be readily produced.

One of the first considerations is the machine by which this printing is accomplished. Unlike the large, heavy, and expensive machinery necessary for a 30 × 40-inch print, the machine for glass printing is a simple pair of indiarubber-covered rollers, not costing more than £15 to £20. In its general appearance and working, the machine resembles a mangle, and in printing, a tympan of zinc is placed on the plate before running it through.

To prepare a plate for printing, the glass is first coated with the sensitive composition. The sensitive composition is, of course, a main feature of the patent, and is of such material that occasional exposure to light does not do much harm to it. So far is this the case, that a draughtsman can work out a design upon it, instead of having it transferred. The latter method however is better, and always gives the best results. A lithographic transfer is placed upon it, a zinc tympan put on, and the whole run through between the rollers. The transfer paper used is the result of many years' experiments by Mr. Winterhoff, and is so composed that after the transfer has been run through, the paper can be removed without the use of water. The transfer thus put on the sensitised coating is dusted with a metallic or other impervious dust, and the plate well cleaned. The plate is then exposed to daylight, equivalent to exposure to sunlight for about half-an-hour, and thus the parts on which the transfer is printed are left unattacked by light, the remainder becoming slightly hardened. By well washing, first with turpentine and then with water, those portions originally under the transfer ink are dissolved out and leave the glass exposed. When thoroughly dried and carefully cleared in every detail of the design, the whole is etched deeply with hydro-fluoric acid, for about half-an-hour. After clearing off all the remaining composition and a thorough washing the plate is ready to print from. It is remarkable how well the ink takes to the glass, and it is also rather singular that common 21-oz. glass can withstand the pressure of nearly two tons, as put on in the press. The ink used should be either entirely of Mr. Winterhoff's preparation, or should contain a good proportion of it.

The special features of this patent are:—

1.—There is no actual preparation of the glass to make it take the ink in printing, as in zinc plate substitutes.

2.—There is no fear of the design filling up or becoming worn out.

3.—There is no need for etching and acid stump or gum, as neither are used as in lithography.

4.—The cheapness of the material used.

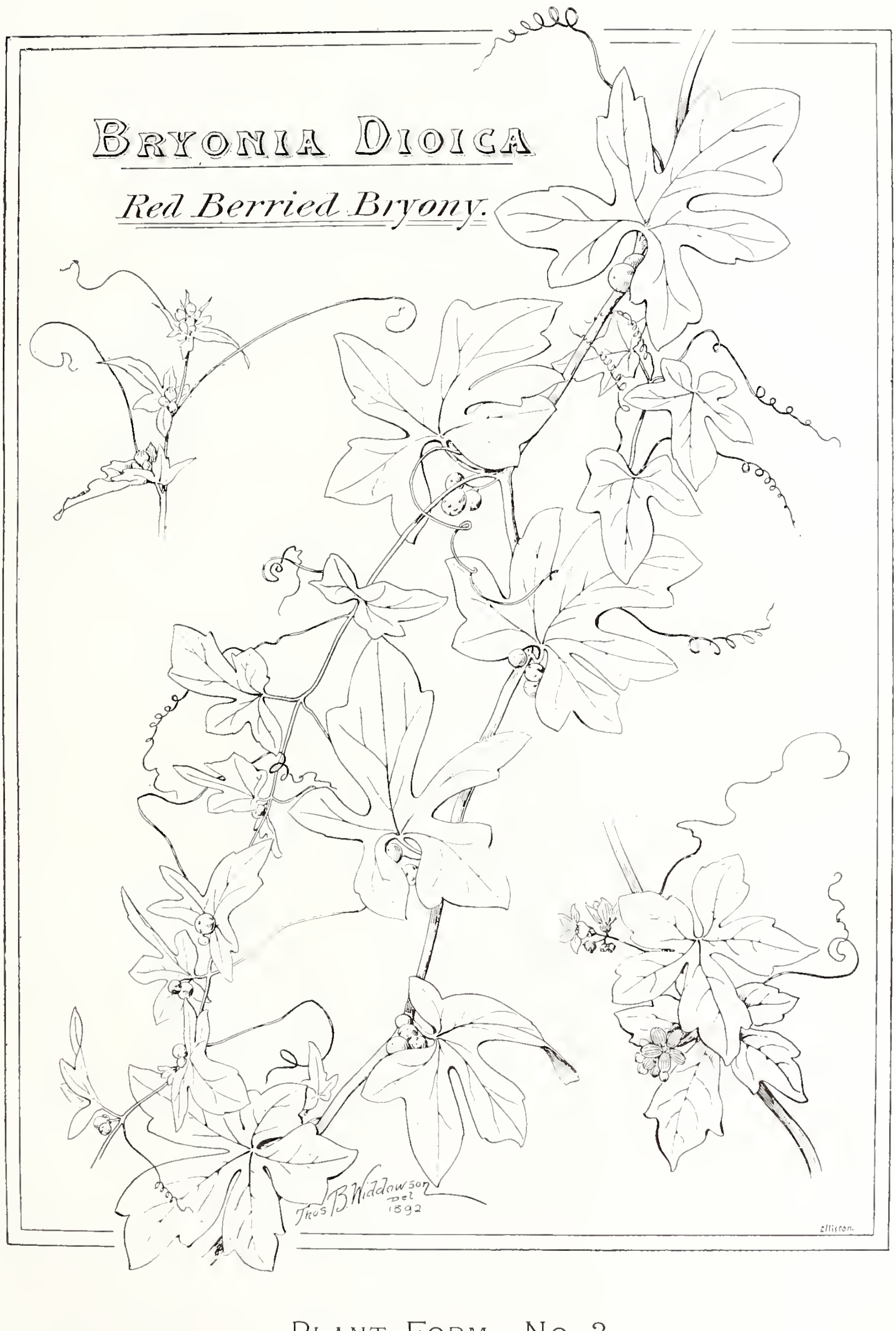
5.—The cheapness of the press.

6.—The facility and inexpensiveness of storage of all or any originals. But it is always advisable to put away at least two plates of each design, to guard against breakages.

7.—The evenness and good tone of the prints from glass.

8.—The freeness of glass from internal action by acids, etc., in inks.

Irate Subscriber: "I demand to see the editor. Where is he?" Printer: "He's in the loft. The citizens tarred and feathered him last night." I. S.: "Yes, and that's just what I want to see him about. The tar belonged to me, and I want the editor to pay for it."—*Atlanta Constitution.*



PLANT FORM.—NO. 3.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper

Weights versus Springs.

For some time machine makers have exhibited a growing tendency to sacrifice one quality in lithographic machinery in order that greater speed might be attained. The bulk of quick-running machinery is accompanied by spring gearing to put on the "impress," and the general result is want of solidity in the work printed. Every conscientious printer who is anxious to keep up the standard should watch carefully that his work is perfect in all directions, and none more so than solidity of fine and coarse work alike. A few years ago, anyone who examined American journals could not fail to note how firm and black every portion of the work was, and undoubtedly it was this cleanness and sharpness which gained for American printing the praise it so well deserved. In all probability it is this same element which tends to place American lithography on such a pinnacle of excellence as compared with the ragged work which is so often seen in England. We are not going to attribute all this difference to the use of weight or spring-pressure, for we cannot overlook the fact that machinery is driven too quickly for good work, that the ink used is too poor in quality, and that the commonest of paper is used—in fact, everything is being run so cheaply that no regard can be paid to the production of good work. But, however much the printer may be governed in his business by these latter considerations, there is at least one point in which it is as easy and as cheap to have good work as it is to have bad, and that is in solidity of work. Solidity of work depends upon :—(1) evenness of the cylinder and its coverings, (2) evenness of the face of the stone, (3) perfectly parallel running of the whole carriage under the cylinder, (4) evenness and constancy of pressure, not only for one impression, but for any number of runs, and a number of other matters not of a directly mechanical nature, but depending upon the ink, paper, rollers, and damping. Of these mechanical difficulties, it is our intention to deal only with number (4), upon which, both in this country and across the Atlantic, diversity of opinion exists as to how such evenness of pressure is to be attained.

We have lately seen in our American contemporary the *Lithographers' Journal* that an eminently practical writer is championing the cause of weights and levers against the spring-pressure arrangements, and the lithographic machine builders have no better excuse than that "fashion and elegance have overthrown this process, and no builder dares to make use of it any more." So much for American opinion. If "fashion" is going to govern the making of printing machines, then we may fairly bid good-bye to improvements or the retention of standard articles. Fashion is so fickle that it should not for one moment govern anything in which the reputation of a business has any stake. Fashion is all very well for women, and can be safely left to them whilst men look after the solid improvements of the world. But what is here quoted as American opinion may be true for them, whilst it certainly is untrue for British makers. Through all the rush and bustle of the last ten years many machine makers have followed the high-speed craze and adopted spring pressure, whilst a small number of experienced firms, notably amongst them, Messrs. Furnival & Co., Reddish, Cheshire, have stuck to the true mechanical solution of the problem of solidity in impression, viz., the weight and lever gearing.

A moment's reflection will shew why weight and lever gearing is the only sure and constant means. Everyone is familiar with the use of springs. Everyone knows that elasticity of metals is not a constant quantity. The more pressure put upon springs, the more they become compressed, and if, whilst under pressure, they are constantly being subjected to concussions or joltings, so much the sooner does the elasticity become diminished and the spring permanently compressed. Now, how is it with levers and weights? Whenever the stone passes under the cylinder, the weight gearing is brought into play, and so long as the lever arms are prevented from resting upon any stop-block or the like, so long must the same pressure be exerted. The weight cannot become in any degree lessened by any length of usage, nor can the leverage become any less, consequently such machinery cannot help but be permanently in exactly the same condition as to weight in impress.

Everyone who looks round and observes the use of springs must see that wherever absolute dead weight is required to be constantly employed, weights—not springs—in some form or another, are invariably used. But only where springs, or elasticity, are only occasionally brought into use, then springs are fairly reliable. Not only are springs "out of place" on heavy printing machinery, but their liability to get clogged with dirt and thereby maimed is another feature which should be considered against their use. One word in conclusion, from the practical point, and the point everyone can judge for himself. All who use Messrs. Furnival's machines, or any other maker's machines with weight and lever gearing, know thoroughly well that they cannot be excelled for firmness and solidity of work, as well as the permanent reliability of such machinery.

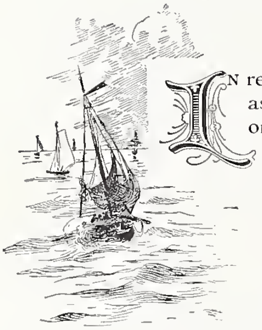
"Plant Form" Supplement, No. 3.

RED-BERRIED BRYONY.

This plant, belonging to the order "Cucurbitaceæ," was a great favourite with the designers of olden times in both works of wood and stone, especially in church decoration. It is one of our most beautiful climbing hedge plants, being prominent in August and September, when its berries assume almost every conceivable shade of colour, from light-green, through yellow and orange, to red and crimson. Its leaves are extremely ornamental, and easily lend themselves to the purpose of the art-worker. They consist generally of five or seven principal veins, of a beautiful yellowish-green, which deepens in tone as the plant approaches maturity. Its long tendrils twine round whatever is within reach, and it is difficult to get a long stem without breaking them. The plant is of such a splendid growth that it will well repay the most careful study, and the present drawing must by no means be taken as exhausting its numberless beauties. It must not be confounded with the Black Bryony, which shows marked differences in character.

The Rise and Progress of Lithography in Britain.

By Philip Butler Watt.



In resuming our history as much as we can in chronological order, we come now to J. Nethercliffe, also a pioneer lithographer, who began business in 1830, and did mostly plan and map work. He was granted a premium of £20 by the Society of Arts for his method of making lithographic transfers, shewing that at an early date this Society had taken an interest in the new art.

About 1823 William Day, the founder of the celebrated firm of Day & Son, began business as a lithographer in Queen-street, precisely on the site of the new Masonic Hall. He had previously been a law clerk writer, and took to lithography as a means of reproducing his law writings. He purchased some litho presses from Rowney & Sons, and being a man of some considerable natural abilities, took to learning the new art as rapidly as possible, and taught himself all that was then known of lithography. He made all his own materials for its working, and thus practically became acquainted with all its details. He is said to have invented a lithographic press which is still in use, and known under the name of the "top lever." Being also a far-seeing man, he had secured the services of the young Belgian artist, Louis Haghe, who added so much to the reputation of the house, at that time known as the firm of Day & Haghe, though Mr. Haghe only gave his name to it, having no monetary interest in it, and only receiving remuneration for the work he did as an artist. The firm at this time mostly worked for the publishers, and it was in this workshop, founded by William Day, that some of our most celebrated lithographic artists of the time were educated and brought out, such as Joseph Lynch, Thomas Picken, F. Bedford, Joseph Needham, &c. He died suddenly at a comparatively early age in the year 1845, and after his death the business was carried on by three sons.

We must now refer to one who, though not a practical lithographer in the strict sense of the word, was an artist of some repute, and did much for the spread of the art; we refer to Baron Taylor, who, though of English origin and education, resided in Paris, the title of Baron being conferred on him by Louis Phillipe. His book "Voyages Pittoresque set Romantique en France," and which deserves more than a passing notice, is in itself a history of the progress of the art of lithography, and contains some of the works of the first litho artists of the day. It was in large folio, and extends to something like twenty volumes. It appeared as early as 1820, and the publication went on for nearly half a century. The early style in which the art was then practised will be found in the first volumes, and the progress may be traced down through the period in which lithography was so largely employed. Taylor did not limit himself to foreign artists, but employed draughtsmen of all nations, and wherever he could find them. Amongst the English artists he employed the names of Harding, Haghe, Barnard, Gale, and others may be mentioned. A copy of this fine work is to be seen in the library of the British Museum.

In noticing the early works of British lithographers, we must not omit to notice the publications of the firm of Rowney & Co., who did much to foster early lithography, and who produced some of its best efforts. They were early promoters of the art as well as early practitioners of it. Some of their works have never been surpassed, notably that of "Ulysses deriding Polyphenus," after Turner, published in 1857, and is a splendid specimen of the art, measuring 27-in. × 18-in.; it was put on the stone by one Charles Ogle. Other works of a similar character followed, such as "The Building of Carthage," and pictures of Venice, all of sterling merit. Dickenson's, of Bond-street, may also be named as patrons of the art, as they published many works on lithography, including the large views of the great exhibition of 1851; also the firm of Windsor & Newton, who published some of Harding's sketch books. Colnaghi & Co., of Pall Mall, also sought the aid of lithography, and published Simpson's views of the Crimean war amongst other works, as also a fine collection of studies from Raffaelle, entitled the Raffaelle Gallery, all in chalk, from this celebrated artist. A fine copy of one of them, the "Virgin and Child," by T. Fairland, is to be seen in the print room of the British Museum, and is well worthy of inspection.

Lithographic artists at this time were not as a rule mere copyists; they had to be artists, with practical knowledge of colours. The result was that most of them practised painting and there was a tendency amongst them to become painters, of which numerous examples could be given. One of them was Robert Carrick, who was originally a lithographic artist and served his time to the art with Allan & Fergusson, of Glasgow, and came to London in 1844 to prosecute his studies as a painter, but was employed only occasionally by Day & Son in litho work. He put on stones some of Simpson's views of the Crimea, and other subjects, but what makes his name of some repute is that, in 1850, he produced what Mr. Simpson says, in his paper on lithography read some little time ago before the Society of Arts, one of the finest chromos that has yet appeared, the subject being "The Blue Lights," a very beautiful oil painting by Turner, full of the most delicate tints and at the same time a work of great power and effect. Mr. Carrick reproduced this work with only twelve stones. What had previously been done by him in lithography was in the early style of tint printing (the black printed first and a few tints added). Mr. Day, on requesting him to reproduce Turner's picture, suggested as a

WILLIAM SIMPSON, F.G.S., &C., &C.
(Crimea Simpson).

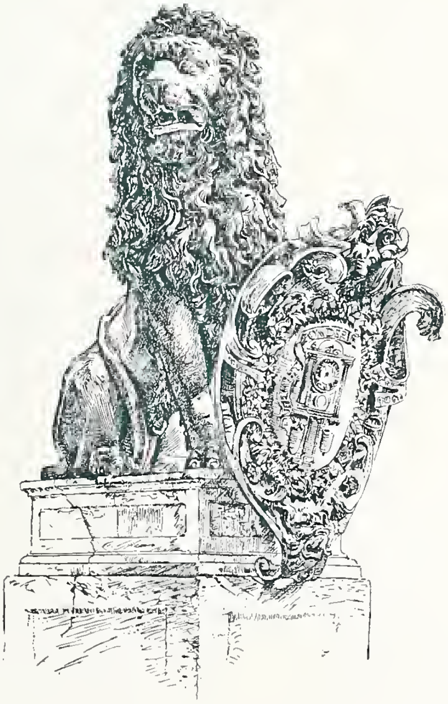
WILLIAM DAY, SENR.,
Founder of the firm of Day & Sons.

ROBERT GARRICK, R.I.B.A.

departure in the colouring, that each stone should represent a colour, and the whole producing the subject and the effect required. Mr. Carrick started with this idea, and being a chromist with artistic training, produced this fine specimen, which, indeed, was the first real chromo-lithograph emanating from the firm. There were very few copies of this printed, so that it is but little known. A specimen was recently sold and brought the sum of thirty guineas, which shews how much this early work is now appreciated. There is, however, a fine copy to be seen in the print room of the British Museum. Mr. Carrick is now a well-known painter and a member of the Royal Institute of British Artists. We may be allowed to ask here how it is that the lithographic profession know so very little of the treasures of the art contained in this print room? It is certain it well deserves a visit from those interested in the art, and also certain that the always-courteous attendants will shew those who visit it everything in the way of lithography the room possesses, while the talented Professor Colvin who presides over this department, and who takes a lively interest in the art, will be pleased to see any practical worker in it and give them any information asked for.

The art of lithography has, as a profession, developed some remarkable men, and has attracted talents of various kinds. Amongst the earliest contributors to lithographic talent none has enjoyed wider popularity than William Simpson, lithographer, artist, war correspondent, and traveller, who has covered as much ground as Captain Cook or Marco Polo, and seen as much of war as any general. William Simpson was born in Glasgow and was apprenticed to the firm of Allan & Fergusson of that city, and was a practical lithographer in every way. He tells us that in his early years there were few of the processes connected with the lithographic art that he could not turn his hand to. At an early age, in 1851, he came to London and entered the establishment of Day & Son, where his practical knowledge and indomitable industry soon made him a valuable acquisition to that firm. He not only proved his practical knowledge of the art, but also the quality of being a rapid sketcher. The result was that he was mostly employed in doing views of important places, which were as rapidly produced and published, and with great success, many of them shewing great vigour and truthfulness, and also a remarkable instinct for seizing hold of picturesque situations. He also at this time assisted his contemporary, Louis Haghe, in producing some of the subjects of David Roberts' "Holy Land"; and was also engaged in helping to produce the illustrations to the views of the great exhibition of 1851. So busy was he kept at the time with this kind of work that he tells us he could scarcely get a day to himself to go and see it. No large or important subject was at this time produced by him, although perhaps some of his views on the Clyde might be classed as such. In 1854 the Crimean war broke out, and in September of the same year came a request to Mr. Day from Messrs. Colnaghi & Co., the publishers of *Pall Mall*, for an artist to go out to the Crimea to take sketches of the war. Mr. Simpson was selected for the enterprise, and accordingly the young lithographer started out, at twenty-four hours' notice, on the expedition, and his work resulted in a series of tinted lithographs of the most remarkable events of that war, which, for truth and force, surpassed any previous attempts of this character. As it was he became somewhat of a hero, under the name of "Crimean Simpson," for he was not content to sketch from report, and could not be persuaded to remain in security, but must go to the front, and was frequently in those dreadful trenches we have read so much about. This work was lithographed and published in two folio volumes. In 1859, Mr. Simpson accepted a commission from Messrs. Day & Son to go to India and produce a series of illustrations of that country. The large work of Roberts' "Holy Land" was taken as the model, and it was to contain no less than 250 subjects; the great temples, the magnificent tombs, and the grand scenery of the Himalayas, Tibet, and Cashmere, were all sketched in turn, and this produced the celebrated work of "India Illustrated." The year 1866 was the date of Simpson's introduction to journalism. The marriage of the Princess Dagmar to the Czarewitch took him to Russia in the service of the *Illustrated London News*, and that interesting event was fully portrayed by him, his work as a journalist and illustrator being so highly appreciated that he was at once made a member of the staff. On the conversion of the firm of Day & Sons into a limited company, the directors began to publish his work on India, and entered into negotiations with him for his personal superintendence of it. This was arranged, he having a room allotted to himself, and he thus nominally became the manager of the fine art department of the company. The Abyssinian war broke out early in the year 1866, and this brought a request from the *Illustrated London News* for him to go to Abyssinia, and at his desire he was relieved of his duties at Day & Son's, and started for the seat of war, which he duly chronicled. At the close of this war he was sent to illustrate the opening of the Mount Cenis tunnel and the Suez Canal, and at that time visited Jerusalem, returning by way of Rome; while there he was present at the opening of the Vatican Council, and illustrated that event.

In August, 1872, he commenced a journey round the world, which was to include a visit to Pekin, and witness the ceremony of the then Emperor's marriage, and to return by way of the new world. This journey was also at the request of the *Illustrated London News*, and in addition to this commission, he also took one from the *Daily News*, to send such items of information as would be interesting to the readers of that journal, and these were all published under the title of "Meeting the Sun." In 1870 the Franco Prussian War broke out, and Mr. Simpson was sent as a war correspondent, and was soon an actual spectator of some of its most desperate episodes. Arriving in Paris, and being refused permission to follow the army, he started for Metz, and took a sketch of that fortress, which very nearly got him into trouble as a spy; but by a lucky inspiration he found his way to Forbach, and took a careful sketch of the locality, and as soon as the great battle of that name occurred, he was enabled to send home the scene almost simultaneously with the



Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

SUGGESTIONS.

telegram of the event. He also went to Strasburg, and from the German trenches saw the capture of that city. Moreover, he was a resident in Paris during the memorable siege of the Commune, and has perpetuated by his pencil some of the scenes of that desperate struggle. In 1878-9 he went through the first half of the Afghan war, and saw the treaty of peace signed by Yakub Khan and Cavagnari. He also accompanied the Afghan Boundary Commission to the Afghan frontier in 1884-5. This expedition took him via Tiflis, to Baku on the Caspian, thence he went to Teheran, through Persia to Central Asia, where he wintered in tents at Bala Murghab. Since then he has gone on no large expeditions, but has been sent on important occasions to Paris and Berlin.

Mr. Simpson is a member of the Royal Institute of Painters in Water Colours, Hon. Associate of the Royal Institute of British Architects, Member of the Royal Asiatic Society, Fellow of the Royal Geographical Society, Member of the Alpine Club, &c., &c. This last dignity was conferred on him because of his travels in the Himalayas, where he went over their highest range, ascending 19,000 feet! 4,000 feet higher than Mont Blanc.

[To be continued.]

Colour Photography.

Mr. Frederic E. Ives recently made an important communication to the Franklin Institute upon the subject of his process of colour photography, in the course of which he explained and illustrated some improvements he had made in the means of operating the process, by which it is rendered comparatively simple and capable of immediately profitable commercial operation for lantern illustration. Mr. Ives shewed that, by an improvement on his helio-chromic camera, the three negatives, representing the effect of the object photographed upon the three fundamental colour-sensations, are now not only made from one point of view by simultaneous and equal exposure, but also upon a single sensitive plate, so that the helio-chromic negative is obtained with no more trouble than an ordinary one, and any number can be made in which the relation of one element to the others is exactly the same. The colour-prints can also be made from these negatives by a single exposure in transparent gelatine, and separated only when ready to dip into the dye solutions representing the respective colour-sensations. Mr. Ives shewed, however, that it is not necessary to go to the trouble of making the colour-prints when only lantern illustrations are required. Lantern positives, made from the helio-chromic negatives with no more trouble than ordinary lantern slides, were projected on the screen in the natural colours in the ordinary lantern, by means of a special front of Mr. Ives's own devising, and which was substituted for the ordinary projecting lens in one second, so that an exhibition of ordinary lantern slides can be interspersed with projections in natural colours without causing any delay in changing from one to the other. Several such projections were shewn. The approximation to the colours of nature was marvellously accurate. The positives were about one-third smaller than the ordinary projections, but were as sharply defined, and in as bright and true colours, as those produced with the more elaborate and troublesome lantern. The lantern front used for these new projections consisted of three prisms, converging light from a single condenser and radiant to three small projecting lenses, the necessary colour screens being located just behind the objectives.

Mr. Ives also shewed one or two cameras which he has devised to produce the helio-chromic negatives, in which three negatives are made on a single plate, the image-forming rays being transmitted to the single gelatine dry plate through three reflecting prisms, and from points of view so close together (less than half an inch apart) as to make perfect registration easy of accomplishment. By the other camera the three negatives will be made from the same point of view. Mr. Ives also announced that he was at work on a scientific novelty in the form of an optical device for the table, in which these positives could be seen in the natural colours as readily as stereoscopic views are seen in relief in the stereoscope.

Photographs on Silk.

People who are practical photographers can well utilise silk for presenting their customers with souvenirs—sachets, almanacs, etc.—at Christmas time. Sensitized silk can now be obtained commercially, but there is not much difficulty in preparing it. China silk is the best, and there is a great variety of ground tints to choose from. The silk must be well washed to free it from dressing, and then immersed in the following solution :

Common Salt ..	4 grams.	Acetic acid	15 cc
Arrowroot	4 ,,	Distilled water ..	100 ,,

The arrowroot is dissolved in the water by the aid of a gentle heat, and then the other ingredients added, and finally: Tannin, 4 grams, dissolved in distilled water, 100 cc. are also added, and the mixture filtered. The silk is allowed to lie in this salting bath for three minutes, hung up to dry, and afterwards sensitized on a silver bath as follows :

Nitrate of Silver	3 grams.
Distilled water	25 cc.
Nitric acid	½ drop.

The silk is floated on this for one minute, then hung up till surface dry. It is printed in the usual way, and washed and toned as usual, but it is said that the mixed acetate and sulphocyanide bath give the best tones. —*Anthony's Bulletin.*

Everlasting Paste. — Dissolve a teaspoonful of alum in a quart of water; when cold, stir in as much flour as will give it the consistency of thick cream, carefully beating up all lumps. Stir in half a teaspoonful of powdered resin. Pour on the mixture a teacupful of boiling water, stirring it well. When it becomes thick, pour into an earthen jar. Cover and keep in cool place. When needed for use, take some from the stock and soften with warm water. Paste thus prepared may be made more pleasant by adding oil of cloves; and it has been known to keep good at least twelve months.

The Yorkshire Strike of Litho. Printers.

If we may judge from reports, the strike of lithographic printers in Leeds and Bradford is still pending and likely to continue, as the employers have set their faces against opposition, and seem determined to go on with the struggle whether they lose their custom or not. The printers are equally strong in their determination to withstand the conditions named by the employers, and as they have nothing to lose in the struggle, they have a better spirit and a lighter heart to go on with the dispute. The employers perhaps overlook the fact that whilst they are not executing the work, some other firms are, and the increased business at other firms gradually absorbs all those whom they have discharged, and in the end it means permanent loss of what was probably good custom. Whilst the printers with their facilities for moving from town to town, readily find employment and suffer only a temporary hardship.

Many of our readers may be unaware of the facts of the case, and it may be advisable to glance back to see why this dispute arose.

In the winter of 1890, the Allied Printing Trades of Manchester met in committee and determined to ask for reduced hours. The employers met the committee in a proper spirit, and from the first showed signs of treating with the trades in a gentlemanly and conciliatory manner, with the result, that after about three months' consideration, a compromise was offered and accepted. But during the course of these negotiations, the Allied Committee inferred that so far as lay in their power, the unequal competition set up by this reduction should be counterbalanced by a national movement for a similar reduction. As a result of this virtual promise, one section of the Alliance—the lithographic printers—has been working in various towns with this end in view, and in many cases the reduction was given with a willingness which was highly appreciated.

The same movement was set on foot in Leeds and Bradford, and negotiations went on for some months, with the result that in an indirect manner the reduction was granted, with a proviso, that as there was so much urgent work in hand, the printers should continue to work overtime—the bugbear of the artisan's existence—until the mass of work was disposed of. We state this on the authority of a paragraph in the *Leeds Daily News* of February 4th, 1892, which is a copy of a notice issued on December 4th, 1891, by the head of one firm to the employés. The notice runs thus:—

"*Re* THE UNHAPPY DISPUTE AS TO REDUCTION OF WORKING HOURS.

"I have considered and decided to permit the week's working hours for adult Litho. Machinists and Pressmen to be reduced to 52½ hours per week, for which the present wages will be paid (the extra 2½ hours will be paid for as ordinary time), also with the distinct understanding that overtime will continue to be worked until 9.30 each evening till the busy season is ended, and overtime no longer necessary.

Signed, ALF COOKE."

With such a distinct understanding before them, the printers settled down conscientiously to their part of the bargain, and worked the overtime required. At length the necessity for overtime no longer existed, and the printers awaited patiently the promised reduction. To their surprise, early in January, instead of the reduction, they were made to understand it was not forthcoming, and those who did not care to accept the old rules, could find employment elsewhere. The printers very justly resented such false treatment, and accepted their notices which expired on January 30th, and threw some 180 men out of employment. Since then, public meetings have been held in Leeds (Feb. 18th) and Bradford (March 9th), at which the general secretary of the printers, Mr. Councillor Kelly, and other leading Trade Society officials spoke, notably, Mr. C. Fenwick, M.P., and have thus placed the facts of the case plainly before the public in those towns. We were not at all surprised to see the meagre reports of these meetings which appeared in the local daily papers, for we must admit that the press, although considered so free, generally has a happy knack of gagging information which is likely to turn in any way upon its own pocket interests.

During the same time the "Master Printers' Association" has met, but we have no idea as to what conclusions they came to. All we know is that the dispute continues, and that many non-society men have found employment at the affected firms. Whether the work is done so proficiently as before we have no proof, but if we may be guided by people on the spot, we are under the impression that the non-society men are anything but profitable substitutes.

Employers generally lose sight of the fact that their employés are human, and are not machines; and as such are only capable of a certain amount of both mental and bodily work. The speed of machinery has increased during the past ten years in a far greater ratio than the speed of humanity, yet men are expected to conduct the increased output at the same rate of wages, and during as long hours as heretofore; instead of employers meeting the matter half-way, by considering that those who really wear their existences out making the wealth of the nation are entitled to a fair share of the profits and luxuries, which are the ultimate result of this more speedy production, and are for the present mainly enjoyed by employers of labour, rather than by both.

One more point which we know from experience is a great lever in these disputes, and that is, if employers will only show a kindly and generous feeling to their employés, the latter would appreciate it, and give in return their honest mead of productive labour.

Photo-Mechanical Lithographic Printing Processes.

CHAPTER IV.

Half-tone Lithography by Various Granulations.

In chapter III. was placed before the reader a process which, in the hands of the careful manipulator who is prepared to experiment with the subject, a method which will give satisfactory results, having an appearance as little removed from ordinary silver print photographs as can be expected, considering the very broad differences of treatment and finish between a photo-litho print and a silver print photograph. It is inferred that the manipulator who turns his attention to this subject is prepared to work hard and earnestly, and, in choosing the negative, will carefully compound the ferricyanide composition so that a grain of the necessary coarseness or fineness is produced to suit the subject. Unless this is done, and the results of a number of experiments carefully tabulated so as to shew how much ferricyanide is put in and the different degrees of heat in the bath and drying process for each quality of negative, it is almost unnecessary to say that the manipulator will be disappointed with the first results and may relinquish the process altogether.

In thus turning from Husband's papyrotint process, there are alternative methods at hand which may give more satisfactory results, but will present more of the mechanical and less of the photographic effect in the finished print.

Bearing in mind the subject matter of the concluding paragraph of chapter II., the alternate process now to be treated is the mode of printing a granulation upon the transfer paper.

The granulations which may be thus used are: the grain of (1) grained stone or (2) chalk paper; the stipple dot effect of (3) dotted steel or copper plates; the granulation of (4) Bacon's grained plates; the cross-line effect, either from (5) engraved steel plates direct or (6) by preparing a cross-line negative; or by (7) splashing an even grain.

The grain of GRAINED STONE is accessible to many, and may become the standard method with them. It is necessary to have a stone grained as finely as it is possible, so that when the points have been evenly chalked, etched, and rolled up, a print from it shall have an even photographic tone, as soft almost as the subdued effect of ground glass, but this softness of effect must be accompanied by a distinctness in the grain which produces a series of fine but solid points on the paper. Having the stone thus prepared, the chalking and printing are done in the usual lithographic way. The grain being printed upon an unsensitised photo-litho transfer paper. The unsensitised paper prepared by Husnik and obtainable from Winstone, of London, is very suitable. Should this prove too soft, it is advisable to compound a composition, using the hardest gelatine, and according to the recipes already given for transfer paper for "photo-litho in line" in Chapter I.

In all these granulation methods, the grain must be put upon unsensitised paper, or, if sensitised, it must be printed on in the dark room and dried there before exposure. The ink must be a good opaque one, free from any trace of grease, of any hue which will give the greatest opacity, for, unless permanently opaque, the light will insinuate itself and destroy the shape of the grain all over, or will give a patchy appearance. Much will depend on the accommodation and means at the disposal of the reader as to how this printing should be done. Experience has shewn that as soon as the printed grain is upon the paper and sufficiently dry, the sensitising should take place and the photographic printing followed on as soon as dry. This rapidity of processes prevents the ink drying into the gelatinised paper, and thus refusing to open the grain in the picture when washed out.

The granulation having been printed on the unsensitised transfer paper, it is allowed to dry. The paper is then coated with the sensitising film, compounded according to the recipes given in Chapter I. The paper is dried in the dark room and is then ready for exposure under a good half-tone negative. As to time of exposure, the same remarks apply to half-tone work as already made in chapter I. on exposure and appearance of the print in "photo-litho in line."

The remainder of the process will now become apparent to most of our readers. The photographic print will affect the whole of the sensitising film, but it will only be in the interstices of the printed grain that the combination of the chrome salt and the gelatine can take place and form the insoluble compound which is the basis of photo-lithography. The print requires to be developed and inked up. If the grain were printed on the face of the sensitiser, then it would be necessary to at once soak the transfer and wash out the unaffected matters under the grain, to prevent the rolling up ink taking on the printed grain, or, by removing the printed grain, allowing the light to render the films insoluble. In such a case, after washing, the inking can be done by rolling or with a sponge, as described towards the end of Chapter III., and the result will be a finely grained photo-litho transfer. If, on the contrary, the printed grain were put on the gelatinised paper before sensitising, it is permissible to forthwith roll or rub up the transfer after a few minutes' soaking in cold water, and develop the picture; finally to wash out the grain, by soaking in cold water a few minutes and gently rubbing with a wad of cotton wool; after which the print may be still further inked up, to the manipulator's satisfaction, dried, and transferred to warm stone.

In thus passing rapidly over what is in reality a very delicate operation, the reader must bear in mind that every act has its result—good or bad. In washing

out the grain, the slightest abrasion produces streaks which cannot be remedied and the work is destroyed. In rolling up, the fine work may be torn from the paper; in rubbing up, a streakiness may be produced; and in gumming up upon the stone, immediately after transferring, the sponge is very liable to tear fine lights all across the print. To gum up, allow a thin solution of pure fresh gum to be poured gently on the transfer until it spreads out evenly and thinly all over the work. The stone should stand some time before removing the transfer, and a much longer time before attempting to prove from it.

The principles and modes of procedure which have been thus fully described for grained prints apply with the same force to all the other modes of granulation under consideration, and it may be here noted that all these half-tone processes can be far more conveniently executed by using any of the patent zinc-plate substitutes for stone, instead of paper to carry the composition. It will be readily seen that the ease of manipulation of rigid thin plates is far superior to the limp paper method, and gives greater accuracy of measurement, but to use zinc plates the negative must be reversed.

The granulation of CHALK PAPER, especially the mechanical grains, gives a more decided character and a more open appearance to the work, not unlike the granulation of Dallastype prints. The chalk paper must be chalked evenly and transferred to stone. From stone it is printed upon the gelatinised or sensitised transfer paper as already described for grained prints.

The DOTTED PLATE is put on the photo transfer paper either direct from plate or by first being transferred to stone and finally printed on the transfer paper.

The GRAINED PLATE has a grain very similar to chalk paper, and can be used for graining transfer paper for chalk drawings. The granulation is somewhat more solid than is produced by chalking chalk paper, and can be put on the transfer paper the same as the dotted plate.

The CROSS-LINED plate requires to be exceedingly fine if cut for the purpose of printing direct or by transfer upon the photo transfer paper. The more reliable plan is to prepare a photo-engraved block of the cross-lines, produced by taking a photograph from a sheet of engraved lines, and, in the operation of photographing, give the plate a second exposure, after turning the sheet of engraved lines upside down, or turning the plate in the dark slide, so that the final photograph shews crossed lines. From this negative the zinc block can be prepared, or a copper plate photo-etched, and the result in either case can be used for printing the cross-lines from.

The SPLASHED GRAIN is liable to be less even than any of the foregoing methods unless it is done by a machine which throws off a large surface of spray at one time. The air-brush can be used for this purpose, but the fact of it being entirely under the control of the hand is liable to give unevenness, and it is only where a machine giving a spray can be used that this mode of graining can be utilised.

There may be other methods than those mentioned which may be within the easy reach of some of our readers, but having thus laid down the principles of the process, it can be left to the ingenuity of the readers to use every available means of obtaining the end in view.

[To be continued.]

A Hint on Photographic Etching.

By LEON WARNERKE.

At the present time, when photo-printing processes are so largely used, it will not be out of place to direct attention to a valuable fact indicated by M. Merget some fifteen or more years ago, and successfully applied by myself to the production of photo-engraved plates.

If on well-cleaned zinc plates is spread a solution of any soluble salt of platinum, gold, silver, copper, nickel, or cobalt, a dark spot is produced by precipitation of the metal in powdery condition.

If now sulphuric or hydrochloric acid, diluted to such extent that it can no longer act on the clean surface of the zinc plate, be prepared, and the plate bearing the spot above mentioned plunged into the acid bath, it will be observed that while the clean surface of zinc remains bright and unchanged, violent evolution of hydrogen is observed on the spot previously produced, indicating that etching action has set in. This etching continues until the acid is exhausted. The metallic precipitate, if not disturbed, mechanically sinks, while the hole is deepened by etching, and the side walls, not being attacked by acid, remain vertical.

The application of this principle to photo-engraving is obvious. When the photographic image is produced on the metallic plate by the well-known methods in albumen, gelatine, asphalt, or transfer of greasy ink, the plate is submitted to the action of the metallic solution until the uncovered surface of the plate is blackened and then etched. The energy of the etching depends on the nature of the metal precipitated.

In my hands, the best result was produced by using ammonia tartrate of nickel. It must be remembered that any mineral acid can be employed except nitric, which produces reverse action.—*British Journal of Photography.*

ETCHING BY ELECTRICITY.—Not very long ago an experimenter in Berlin found that by covering the back of a copper plate with resisting asphaltum solution, and having an etching prepared by the artist etcher, or by photography, on the grounding on the face of the plate, he could execute the actual "etching" readily in the electro-plater's bath. The plate with the design on is attached to the positive pole, and the battery or dynamo is put in circuit; immediately the copper in the design, *i.e.*, where the plate is exposed, commences to follow the current and becomes either deposited on the negative pole or compounded with the bath liquor. However, the design is etched to any desired depth, and with an evenness almost unattainable by acid applications. If necessary, the artist etcher can temper the work afterwards by acid etching.

MANDER BROTHERS'

WOLVERHAMPTON.

Specimen of

BRONZE BLUE.

Printed with Mander Brothers'
BRONZE BLUE
LITHOGRAPHIC INK.

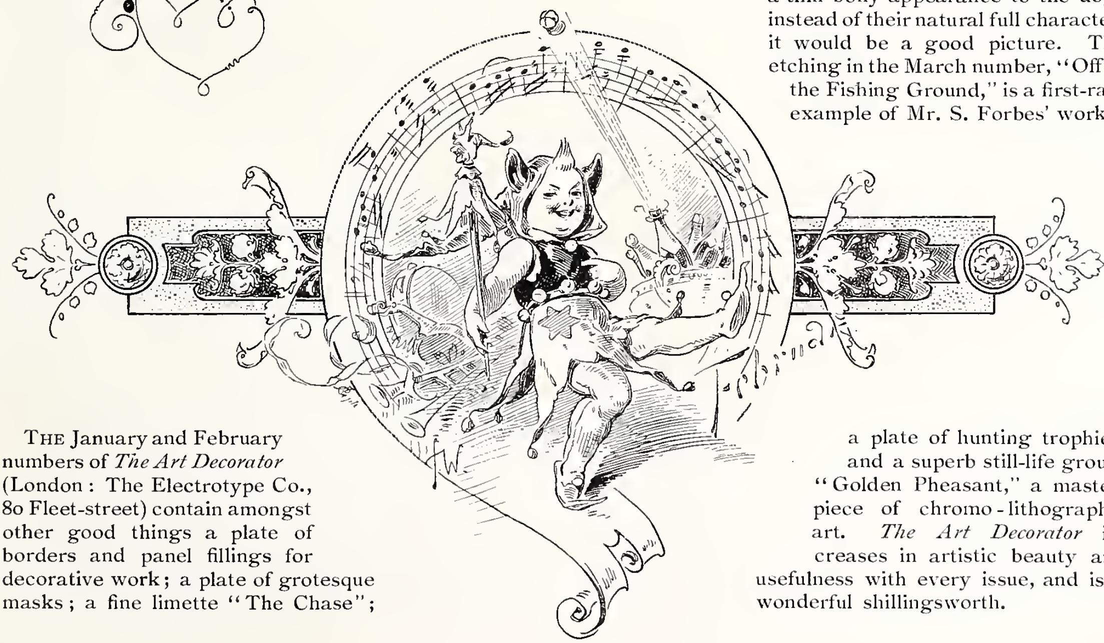
Book Notes.

The designs on this page are specimen illustrations from a new series of "Figure Studies" (Figurale Compositionen) just issued by Herr Josef Heim, of Vienna. The designs, which are by the well-known artist, Ferd. Wüst, consist of pretty amourettes (cupids) and genie (dwarfs), and numerous presentations of female beauty emblematic of the arts and sciences, the seasons, etc., artistic in treatment and grouping, printed for the most part in monochrome. There are twenty-two plates (4to), many of them bearing from two to four and six designs, and the selling price is 10/-, in artistic portfolio. To litho artists and draughtsmen the collection would be worth ten times its cost.

With the above comes a new series of designs (in folio) for certificates, diplomas, presentation addresses, etc., suitable for almost all occasions. They are from designs by various well-known Viennese artists, are full of life and vigour, and are tastefully printed in tints on flat-tint grounds. There are twenty plates in artistic portfolio, and the price is 10/-

In both of the foregoing works there is more than the usual number of designs suited to English tastes, and the rest are full of ideas that may easily be utilised by the appreciative artist or draughtsman. Both portfolios may be had from The British Lithographer office.

The *Art Journal* of February is more than usually interesting. The work consists mainly of three subjects, viz.: "The Work of Mr. John Charlton," "Outdoor Venice," and "Outings in India," each well illustrated, and if the two latter are continued they should form excellent works of reference. The frontispiece is an etching of a pack of hounds eagerly on the scent, and were it not for the liny character of the etching, which gives a thin bony appearance to the dogs instead of their natural full character, it would be a good picture. The etching in the March number, "Off to the Fishing Ground," is a first-rate example of Mr. S. Forbes' work.



The January and February numbers of *The Art Decorator* (London: The Electrotype Co., 80 Fleet-street) contain amongst other good things a plate of borders and panel fillings for decorative work; a plate of grotesque masks; a fine limette "The Chase"; a plate of hunting trophies, and a superb still-life group, "Golden Pheasant," a masterpiece of chromo-lithographic art. *The Art Decorator* increases in artistic beauty and usefulness with every issue, and is a wonderful shillingsworth.

The *Art Amateur* gives in the February number a series of selected sketches from the work of L. Eugène Lambert, "The Raphael of Cats"; and in the March number seven lead-pencil sketches by pupils of the Herkomer School at Bushey. The articles on "Still Life Painting," by Allyn Aymar, are continued through both parts, as is "Portrait Painting." The large sheets of designs in black and white are not of the same usefulness to the artist as previous ones have been, but, nevertheless, there is material for the skilful mind in everyone of them. In the March number there are some excellent monograms, and in the February number some tasty designs for China plates. With the February number is presented a first-class copy, in colours, of a painting by W. H. Trood; the subject may not be altogether acceptable as depictive of fact or fancy, but the work of this plate, as well as all others from this periodical, is fully illustrative of American chromo-lithography, and as such should be carefully scrutinised by draughtsman and printer alike. In the same number are included two plates, shewing two stages in a water-colour study of roses. It is very rough, and lacks sufficient finish to give to it the true character of the silky roses which it is intended to represent. The plates presented with the March number are fine copies of water-colour sketches, both of which are undoubtedly meritorious, but are not attractive designs. In the March number there is a thorough tabulation of the use of colours. It is divided into oil, water, mineral—Dresden and La Croix—and pastel colourings, and shews exactly in each series which colours are the most useful for figure painting; portrait painting, divided again into the series of colours adapted for lips, darker pink tinges, flesh, shadows, hair, and eyes; landscapes; distances; middle distances; foregrounds and foliage; and flowers. So complete and useful is this compilation, that we recommend it to every artist and printer.

The *Magazine of Art* for February contains the second frontispiece in colour, produced by the chromotype process. The fine crossings of the lines in the different colour blocks make themselves disagreeably apparent, and the whole production does not come up to the quality of the first attempt in this line in the November part. In the same number are illustrations of the two London Art Union prize plates. Except this topie of current news there is a lack of pictorial interest, which cannot be said of the March number, where are to be found illustrations of the Academy Students' Competition Medal Works, and other pictorial scraps. The frontispiece is an etching by T. N. Chauvel, after a picture by Troyon, which, however full of merit the original may be, the etching gives a clumsy idea of a mountainous sky, without a touch of atmosphere except at the horizon and zenith; and the drawing of one cow's head, together with the general roughness of the work—a roughness not necessary to indicate the subject in hand—give the whole picture a heavy and unattractive appearance.

The new series of "Alphabets" just commenced by Herr A. Weber, of Leipzig, are after the American style, but we cannot say we admire any of those shewn in the six plates in the first part. They are neither tasteful or effective.

A Lithographic "Wrinkle."

The *American Lithographer*, the most able and practical journal in Ameriea dealing with the reproductive processes, awarded a prize of one hundred dollars to the sender of the following "wrinkle":—

"All our lithographers, printers, and pressmen who have ever printed from zinc in the lithographic press are aware that, despite the greatest care, the work upon the zinc plates will occasionally smear or tint. In a word, the printer is unable to keep the work clean upon the plates. Almost by accident a remedy has been discovered. One day, while working overtime, I was printing from zinc. My damping water had been used up, and I was too lazy to go for more. Near at hand was some tea which I had made for drinking, but had found it too strong for my taste. It was without milk or sugar. Because of pure laziness, I used this tea for damping rather than take the trouble to go to the hydrant for water. To my surprise after using the tea, the plate, which before had smeared very much, became gradually cleaned, until the transfer was as nice as could be desired, and as clean as when the plate was first made.

"Then my fears began to stir lest through continuing the tea for damping the work would gradually get too weak, or, as we say, "too sharp." I therefore very closely watched the work, but my fears proved groundless. From that time I have used only tea for damping, and have had no trouble, but always made good work. I have also found it useful in printing from stone. My discovery I have therefore kept sacred as a secret. As to the reason for the effect of which I have spoken, I cannot speak. You probably know more of the chemical properties and action of the tea, and probably can account for the matter."

The editor of the *American Lithographer* adds: "Tea contains from six to twelve per cent. of tannic acid; it is therefore very probable that the above writer is correct in all his statements." We would be glad if some of our English lithographers would test the suggestion and tell us the result.

The Hanley branch of the Amalgamated Society of Lithographic Artists, &c., held their Annual Dinner on Friday, January 22nd, which passed off very successfully. The president, Mr. A. Wood, occupied the chair and Mr. W. H. Edwards the vice-chair. Mr. H. Lockley, in submitting the toast "The Society," spoke very encouragingly of the Hanley branch and the report of the past year. Mr. Price, branch secretary, in responding, said that the number of members in the branch had doubled during the last two years, and now had 90 per cent. of litho artists in the district as members. He also spoke of the benefits derived by being connected with the above society. Mr. Wright proposed the health of the journeymen who had finished their apprenticeship during the year, giving them some good advice and wishing them a very prosperous career. Other toasts, songs, recitations, &c., concluded the most harmonious meeting the branch ever had. Mr. R. Hammersley aeeompanied the songs, &c., very effieiently.

The Lithographic Trade in a Spanish City.

[*Specially Contributed.*]

THERE is a list of some forty-five lithographic printing establishments in the vilely-erroneous annual directory of Consejo-de-Ciento 305, —"La Guía Consultiva Indicador General de Barcelona," a bulky volume. Chief among these are R. Riera, calle-Ancha 15; old widow Roig, plaza-del-pino; the ditto Olivé, calle-Cármen 72; M'n Pujadas, Ausias-March 99; Señor Blasi, Alta-San-Pedro 66; Viuda Ullastres & Sons, Ronda-Universidad 6; C. Ciervo, Ancha 53; M'l Martí-y-Campañá,' Ausias-March 87; L. Tasso, arco-del-teatro 21; J. Gisbert, calle-Tigre 31. In the second ring are such *litografías* as: J. Viñals, calle-Merced 2; P. Fabrega, calle-Mónach 14; F. Llargués, at obscure and clean Bellafila 3; J. Jepús, at fashionable rambla-del-centro 33; Ribera and Estany, calle-San-Ramón 5.

It is the Blasi concern at Alta-San-Pedro 66 which has recently executed an album of the finest lithographic samples believed to have ever been turned out of a Spanish house. This collection of decorative compositions consists of 28 plates (measuring 8 by 13 inches about), printed in 14, 15, and several in 18 colours, on best card-paper, and has been published by subscription—10 duros, or dollars, for Spain, and 15 duros to abroad (carriage paid). Artists, architects, painters, tapestry designers, jewelers, engravers, and others, will appreciate this rich collection of Iberian coloured lithographed designs. All credit is due to G. O. Codina-y-Sert, as the author, for his masterly triumph in Hispanian lithography. The publisher (publieur) is J. Lladó, calle-Gerona 94, Barcelona.

The house Ullastres, Ronda-Universidad 6, executes some of the most artistic work on the peninsula. As the concern is always on the look-out for suitable improvements, they solicit catalogues of machinery, type, etc. But, although so solicitous of receiving such trade lists, it is surprising how little the native houses are favoured by foreign manufacturers.

Lithographic machinery is supplied by M's Balajat, Nueva-San-Francisco 34, who import from Deutschland, or Animalia—pardon, Alemania (the Vaterland) —the españoles using the quadruped word in sarcasm of the Rhinelanders, and as a play upon the Spanish for Germany. There is a little native *maquinaría* made, and engineer Playá-Suñé, of Palau 5, can best tell all about this.

The *fundición* López, Ariban 52, Gracia (adjoining Barcelona suburb), is also an important supply establishment. They issue a modest and extremely well produced journal, entitled *El Arte de la Imprenta*, which is not merely a *réclame* for their house, but is a technical literary review duly recording the more notable achievements in typography and lithography throughout España. It is *The Art of Printing* which will keep all abroad pretty well informed of trade progress in the old Cid country.

The Cataluña lithographers have their society and headquarters with the printers' society—Sociedad de Impresores, calle-Ferlandina, Barcelona. They issue a monthly *Boletín* of trade intelligence, and have an exchange list with European trade journals which regularly replenishes the reading-room table. These are placed on the public file till the next number comes, then are put away until binding day arrives.

Such lithographers as R. Brull, calle-Cadena 40; Busquets & Vidal, calle-Olmo 8; Primitivo Cairell, who has a primitive-enough place at Asalto 26; F. Casajuana, Asalto 72; B. Cau, calle-Milans 2; etc.—all of whose generally petty (but of the ordinary Barcelona stamp) offices the correspondent has noticed several times,—will state of the trade that it is fairly satisfactory year in and year out, autumn being usually the busiest period.

Some of the largest concerns have material, including machinery, to the value of 150,000 pesetas (30,000 duros), and there are many only worth 5 to 10 thousand pesetas, or francs. There are numerous struggling little cribs up on the fifth floors of houses, eking out an existence nobody knows how. These robin shanties cut into the prices of real business firms, and bring down their dignity at a run. The petty owner dodges about among the litho-order-lodging people, sample book under arm (oh, such a shiny, worn, threadbare, faded coat!), and, with a smirking face, offers to do such-and-such work for them in the future at price so-and-so. He gets the job. His two or three sunken-cheek, hungry employés work by piece, and, like apprentices who wear their young hearts out over the "rush," in printing offices where they are on piece, never earn more than subsistence wages. How this piece-work is managed up in those unfathomable garrets is a mystery; even the regular side-walk trade don't know, or profess not to. Yet the piece system prevails, just as it does in some jobbing typo-offices. As to the legitimate living-price houses, their general wages to litho machinists is 45 pesetas, or 9 duros, per week of 60 hours. Artists get the same. Wretchedly bad pay! And, what is worse, living is not correspondingly low priced in Barcelona city.

The principal houses employ from a dozen to twenty men as artists and printers. Their main outputs are ordinary commercial work, and their exceptional lines are in figures and ornamentations for placards and boxes. A deal of fine work goes to Paris to be put on the stone, yet it could be done just as well here, although perhaps a trifle dearer. Stones of course come from Germany. As to prices, these are very variable, and no definite idea can be given of them. The profession is loth to give the information to a stranger. They too often think him an emissary sent by a rival house to make enquiries, although he may show the best of credentials proving his seriousness as a *boná fide* correspondent of foreign periodicals.

In some instances these proofs only increase the more the malevolent suspicions of those visited.

An endeavour was also made to ascertain something about the profits from lithography—what an annual income was like of the average business man. It was found to be always under 1000 duros per year. Where it is over this sum, the connection and house will be a large one, and the money has to be divided among two or more persons. The pro-media benefice for one man—one proprietor of the general-run class—is only some 2000 pesetas, or 500 duros.

In Madrid, some of the chief houses are those of J. Alvarez, calle-Bordadores 3; A. Crespo, calle-Fuencarral 29; sons of Gonzalez, Cueva 7; the widow Alonso (in hands of sons), Caños 5; A. Rodero, calle-Hortalera 124; M'l Sanchez, Huertas 7; J. Mateu, calle-Barquillo 4.

In Valencia (third city of España): Lopez & Carbonell, plaza-reina 7; vieja madre viuda Pascual, calle-Espinosa 8.

Petty officialism must naturally exercise some direct or indirect interference with the business, and the Barcelona *ayuntamiento,* or guildhall, is no exception. This municipality should have more regard to cleansing their own organisation. It was only the other week that *alcalde* (mayor) Porcar had his attention drawn to the scandalous exposure of an official of the corporation named J. Guíu, who, between his desk in the town hall and his domicile at Ancha 71, was bowled out in a series of the shadiest tricks. In fact, Guíu turned out to be a complete rogue—in the vernacular, a tramposo and pillo-bribon,—practising dodges not unknown to people in the same line in other countries. For year after year he had played the same "do" with impunity, but at last he made a mistake. He was found out. The efforts which have been made to hush up and stifle the matter have been amusing in their astuteness,—and successfully has the gag been worked, because up to the present little has appeared in type. The local journals have no pluck, and press liberty in Spain is not worth much: that accounts partly for the news not getting wind. Such is supposed to be the nature of the augean stables, that Guíu is believed to retain his position by simply threatening others with exposure if they do not use their influence to retain him. So this dishonourable character will keep happily on at the expense of the ratepayers, and in a few years retire on half-pay, "full of honours"! This souteneur and masculine puto of the nocturnal cafés should lose his position at least.

The native is shy of informing about the nature of his affairs financial. He will not say anything about his actual worth—of the state of his banking account, and how much he has to the good or bad.

Sunday work is not now current with them. They prefer to give others work—those who find amusements for them. But it is curious how some houses in which English capital is interested work their people unnecessarily on the Sabbath, and, worst of all, do not pay them for the extra labour of a half-day Sundays. Yet the same people might be shocked to work at home—in Albion—on the day of rest. English traits again! They do not scruple to overwork the poor native labourers. A flagrant instance is that of a Scotch cotton concern, who issue so many beautiful specimens of advertisement chromo-lithos. They have a dépôt in Barcelona, and scandalise the British community by persistently breaking the Lord's day.

Two other friendly societies—the Ateneo Obrero, calle-Tallers 22, and Centro Industrial de Cataluña, calle-Guardia 16—also deserve passing mention.

B.L. Examination Papers, No. 3.

[*Conditions and Prizes are the same as in the two previous competitions. Replies must be sent in on or before 7th May.*]

Ordinary Grade.

1. Give a clear description of the production of a circular by lithography. (20)

2. Describe the method of stretching transfer paper for drawing on, and state what points should be attended to in drawing for transferring. (25)

3. Describe fully how you would obtain a sharp open grain on the litho stone. State clearly all the materials you would use. (20)

4. What is meant by keystones for colour work? How are they obtained? Give at least three methods. (25)

5. Are there any advantages of writing or drawing on transfer paper for transferring over the method of writing direct on stone? Give reasons for your answer. (25)

6. State what you know of the defects in litho stones, their cause and influence on the work. (15)

7. Define what is meant by the following terms in relation to colour:—Body, power, tint, shade, and hue. (20)

8. What do you consider the best means of insuring register on press and machine? (30)

Advanced Grade.

1. Explain the cause of setting-off and slurring on press and machine, and give remedies. (20)

2. How should paper for chromo work be chosen: (1) for printing from flat stone, (2) for printing from grained stone? (25)

3. How is grained paper for chalk drawing prepared? Give two methods, and say which gives the best results when transferred. Give reasons. (30)

4. State which of the following pigments are affected by the action of light, and those affected by impure air: chrome-yellow, yellow-lake, Prussian-blue, ultramarine, cobalt, madder-lake, crimson-lake, geranium-lake. (30)

5. Describe the two processes of sprinkling (or splashing) and stippling, and say how you would proceed to prepare for proving in each case. (20)

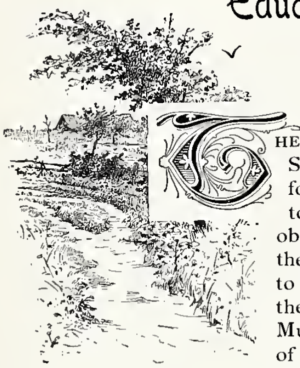
6. How would you proceed to etch litho stone and zinc into relief? (20)

7. Is the principle of the Heliotype process similar to lithography? Give reasons for your answer. (25)

8. Should the inking rollers on machine be of greater or less diameter than the runners? Give reasons for your answer. (15)

Lithographic Technical Education in France.

PART II.



THE steps taken by M. G. Sanier in his endeavour to found a technical school, together with the results obtained by the students in the first year, suggested to Mr. Hovelacque, the then president of the Paris Municipal Council, the idea of establishing a school in which all the branches included in the art of printing and bookmaking should be taught. He was well seconded in these efforts by such of his confrères as Messrs. Navarre, Sauton, Simon Saëns, Petrot, Cemesson, Champondry, and Dépasse, and it was decided that a number of delegates should be sent to visit foreign technical schools with the view of learning the best modes of procedure. With laudable generosity, the Paris Council at once voted a sum of 500,000 francs for the purpose of establishing the school, which was temporarily installed in Rue Vanquelin, the old Rollin College, until a special building should be erected, and for the purpose of this new structure a sum of 1,000,000 francs was voted by the Council.

The first examination for the admission of pupils took place on October 6, 1889, and by the rules each of the applicants for the benefits of the institution were required to present a certificate of acquirements, and to be not under twelve and not over fourteen years of age.

At the present time the work of the school is carried on by no less than sixteen classes, which are so arranged that after a year of preliminary study, the students pass in turn through each class of work in the first year, and after that time they are placed in the department for which they have shewn the greatest aptitude.

The various branches followed and studied are: drawing on stone, engraving on copper and steel, the use of the lithographic pen, chromo-lithography, wood engraving, chemical engraving, type founding, photogravure, composition, lithographic printing, litho transferring, paper, binding, and gilding. It will be readily admitted that a faithful study of such a course on the part of earnest and intelligent youths would enable them to obtain the best opportunities for producing good work and become themselves at the same time good practical workmen and an honour to their profession.

The instruction given during the first year of the apprenticeship is wisely intended to test the special aptitude of the apprentices, and thus they are required to attend seven weeks in each department of the school —not seven weeks entirely devoted to that special branch of the work, but one day of each week is specially devoted to the technical instruction of that branch, and the other days are occupied in taking lessons in such subjects as French, algebra, physics, chemistry, drawing, modelling, and mechanics as applied to the industry.

These lessons are delivered by teachers during the day, and on the reports presented by these teachers the pupils are regularly apprenticed at the commencement of their second year.

The work of lithographic engraving serves as a basis of education for all the other branches of the art, and has already been mentioned in THE BRITISH LITHOGRAPHER, so that the order of work adopted may be of some interest.

The students in the second year devote the mornings to the theory of their art, and from 1 to 6 p.m. they are in the hands of the technical teacher, who takes up the practice of the elementary principles of lithography, the English, roman, gothic, and italic work, and engraving with reference to geographical charts, plans, etc., illustrated with specimens of the different styles of work, as such easily understood subjects as a plan of Paris and a map of France, with various kinds of lettering and mechanical designs.

In the third year these students continue the special morning course of study, and in the practical part are shewn the methods required for the production of commercial work, drawing to scale and from nature, and drawings of mechanical subjects.

In the fourth year the theoretical course is completed, and the mornings also are devoted to study under a technical teacher. More advanced work is taken up, such as invitation cards, certificates, views and sketches, drawings of animals, illustrations for scientific and botanical works, invoices and cards of all descriptions, and all kinds of fancy type.

The previous course has made the student perfectly familiar with all that appertains to the litho. engraver's art, and the information thus acquired from practice and theory combined, enables the students to apply their knowledge to all branches of their art, and to thoroughly fit themselves for the work of the provincial and city houses.

The Council have not done things by halves in their endeavour to form a school for workmen, and take much interest in knowing how many young workmen are fitting themselves and are likely to become properly qualified in their branch of the trade, a number which otherwise tends to decrease more and more as machinery becomes more and more perfected.

Conjointly with the day classes for the ordinary students, there is also a series of evening classes held for the express purpose of assisting young workmen to become more perfect in their knowledge of their trade, and to keep "up to date" in all that concerns the developments of the art. These evening classes are taught by teachers other than those connected with the day classes, and the work on their side as well as the attendance of the young men is entirely without fee or pecuniary reward, and it is a source of gratification to learn that the classes are well appreciated, and more especially those in connection with the work of lithographic printing.

For some time past, the question of forming a series of classes for the teaching of transferring to the stone has been considered as a great desideratum, and it is thought that such an institution could be self-supporting and would be of incalculable benefit in turning out good workmen in this branch.

Sometimes a number of small employers—lithographers—have the services of one head artist for the purpose of laying down transfers, preparatory to the work on the machines. Under this arrangement the profits may be apparently substantial at first sight, but there must ever be a certain loss from the want of good workmen who know all the details of printing from the press, and they should be competent to take entire charge of the transfers and the various manipulations—even of the work involved in the *editions de luxe*—without the assistance of the manager.

I commend these remarks on the subject of the transfers to the readers of THE BRITISH LITHOGRAPHER, and trust that some of them will see the value and advisability of making themselves capable of being entrusted with the care of all the work pertaining to their branch of the art, without there being any danger of a loss in a pecuniary sense.

In my next article I intend to examine into the system of the apprenticeship of chromo artists, and to take up the question of chromo-lithography.

A. VALETTE.

The Discontinuance of "The Lithographer."

WITH the third number of the new series, issued under the brief title of *The Lithographer* in November of last year, this old trade journal brought its career to a close. It is true that for some months the paper has been in a mutable condition, and it was certainly expected from the radical changes which were proposed last autumn that the paper would assume something of its old character, when, as *The Printing Times and Lithographer,* it contained so many sterling articles upon matters directly connected with the trade, and awakening a livelong interest.

Notwithstanding its premature ending, we cannot but look with a considerable amount of admiration upon the work it has done, and feel that, however chequered its existence may have been, it has done a vast amount of good and useful work.

It is interesting to glance back over the years during which it has been published, and notice the various changes it has passed through. When first issued, on July 1st, 1870, its projector and editor was Mr. P. B. Watt, the present writer of the articles on the "Rise and Progress of Lithography" in this journal, and it was printed by John Heywood, of Manchester. After a run of thirteen months it was published by Mr. W. J. Adams, Fleet-street, London, and printed by Messrs. Bradshaw & Blacklock, of Goswell-road, London, the latter firm becoming Messrs. H. Blacklock & Co. about September, 1871. After this change it had a further run of fifteen months, when it was taken over by Messrs. Wyman & Sons, Great Queen-street, London, by whom it was both printed and published. At this stage Mr. Chas. Wyman was the editor, and it was then that its greatest usefulness became apparent. Nearly two years elapsed before another change was made, but the alteration was by no means a sign of either decreased popularity or financial prosperity. In August, 1874, Messrs. Wyman took over the journal known as *The Printing Times,* then edited by Mr. John Lovell and printed by Messrs. Clay, of Breadhill-street, London, which, however well it was printed and conducted, proved a financial failure. In the issue of August, 1874, the title of the combined journal was changed to *The Lithographer—with which is incorporated The Printing Times.* But on the September issue the title was again changed, and became *The Printing Times and Lithographer,* a name which it bore until its final alteration in September of last year, when it reverted to its original title of *The Lithographer.*

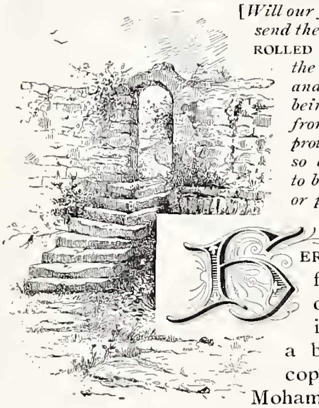
When Messrs. Wyman incorporated *The Printing Times* the field was fairly clear, and having both lithographers and typographers to cater for, they put an amount of energy into the journal which made it singularly and deservedly popular. In January, 1875, the journal was issued in a new series, in which was commenced "The Grammar of Lithography," by Mr. W. D. Richmond, who has been for the past few years the examiner in lithography under the City and Guilds of London. The work thus published in the numbers of the journal was ultimately printed in book form, and has been for some years the only recent standard work on lithography. In a similar way, at later dates were produced Mr. F. J. F. Wilson's book on "Stereotyping and Electrotyping" and his "Printing Machines," also his glossary of "Printing Machine Terms"; Mr. W. D. Richmond's "Colour Printing"; and Mr. Beadnell's "Spelling and Punctuation."

Another masterly compilation, known as the "Bibliography of Printing," ultimately issued in three volumes in 1880, 1884 and 1886 respectively, was carried through all the monthly issues for ten years—1876 to 1885. The work was edited by Mr. C. Wyman, and engaged the energies of Mr. Bigmore, Mr. J. Southward, Mr. Blades, Mr. Berjeau, Mr. L. Mohr, Mr. F. Muller, Mr. Theodore Goebel, and Mr. Theodore L. de Vinne.

After a run of seventeen years from its commencement, and thirteen years from its last alteration, the journal again changed its proprietary. In August, 1887, it was published by Mr. H. G. Davies, Fleet-street, London, and was still printed by Messrs. Wyman & Sons, who two years later became absorbed in the Hansard Publishing Union, which last year came to an untimely end.

In July of last year, after a term of twenty-one years, the journal proprietary was converted into a limited liability, with Mr. W. D. Richmond as the technical editor. But at that time there were rumours of a new journal being floated, which, in a measure, militated against the possibility of the revival of this old and well-conducted journal. Time has proved the truth of this surmise, and we can now look back upon the defunct journal as one of those steps in the evolution of technical literature which comes into existence, serves its purpose—and serves it well—finally to give way to a more robust venture, having as its programme "Lithography up to Date."

Specimens.



[*Will our friends kindly remember to send their specimens either* TIGHTLY ROLLED *or* FLAT BETWEEN BOARDS; *the cost is but a trifle more, and for review they gain in being presented as they came from the machine. If sent unprotected, specimens are usually so crushed and disfigured as to be utterly unfit for criticism or preservation.*]

HERR W. DRUGULIN, the famous oriental printer of Leipzig, is engaged in the reproduction of a beautifully illuminated copy of the Koran, the Mohammedan Bible, of which some pages are before us. The text, in the original Arabic character, is printed in black on a solid gold ground, with borders of Arabic ornament and inscriptions wide at top and bottom and narrow at the sides. Beyond these again is a wide semi-border of Arabesque ornament in gold and colour, with filigree ornament in light blue tint beyond all, the whole worked on a rose pink tint, giving a very rich illuminated effect. The details of the work are wonderfully clear and distinct, and the execution as near perfection as it is possible to attain.

A SHOWCARD for his own business from Herr C. J. Naumann, Leipzig, shows in the centre panel a cupid bearing a flowing ribbon-scroll, with inscription, round the world, the panel enclosed in plain border of red and black; at the top are two cupids supporting a shield on which is a large monogram; at the sides are grotesque griffins, and at the bottom more panels with inscriptions. The ornamentation throughout is in the mediæval style, but modernised, the grouping and treatment are fresh and attractive, and the colouring specially bright and effective. The execution is perfect, and the effect is heightened by the design being set in a solid background of deep chocolate with a plain gold line next the design and a white line at the outside.

THE office card calendar sent up by Messrs. Trevor and Co., Plymouth, is a gem of artistic taste, and is executed in finished style. In the centre is a scroll-band bearing the card of the firm, in the top left-hand corner a pretty wintry view, sprays of flowers and foliage in autumnal tints filling in the rest of the space, the daily tear-off block being affixed at the bottom, a plain line border in gold and tints giving a very neat finish.

THE business card of Messrs. Jesseman & Keddy, Gerrard-street, Soho, W., is a very tasteful bit of engraved work, printed in art-green, direct from the plate, on gilt-edged card. Both lettering and ornamentation show cultivated taste, and the workmanship could not well be better.

OF the numerous really creditable chromo almanack sheets received from various quarters, perhaps no individual specimen surpasses a calendar for 1892 just to hand from Messrs. Horrocks & Co., Ashton-under-Lyne. Measuring 32 × 20 inches, brass bound and neatly got up, the centre is occupied with a fine figure subject, "The Two Roses," exquisitely drawn and admirable in colour treatment, with a spray of roses of opposite colour, the whole forming an exceedingly pretty and popular picture. Round this centre oval are a series of smaller ovals, etc., containing business announcements on bronze grounds. The whole calendar evidences excellent taste and workmanship, and speaks eloquently for the enterprise of the printers and publishers.

MESSRS. ANDREW REID & SONS, Newcastle-on-Tyne, have sent us a copy of their 1892 calendar, and we very much appreciate the good taste of the production. The body of the work is executed with pale-green old-style lettering, and pale-green spaces for the calendars upon a general background of sage-green, picked out with a few well-disposed lines and sprigs of dark yellow. This firm and decided background supports a beautifully printed water-colour sketch of Ovingham, by Mr. F. Simpson. The sketch is a choice bit of north country scenery, painted in the delicate and fascinating style characteristic of the artist.

WE have had the opportunity of examining a lot of commercial lithographic printing done at Messrs. Dawson & Son's, Market-place, Dewsbury, and we are strongly impressed by the excellent machine work. The cheques, menus, bills, receipts, note-heads, etc., have all been taken from copper plates, put to stone and printed in a sharp clear black, much above the sloppy quality so frequently used in the large centres of printing. The quality of ink alone tends to make the work look better, and with the above specimens it makes them cleaner and quite as fine as plate productions.

A HANDSOME sheet of fine groups of roses sent up by Mr. J. Honeyman, with Messrs. Blake & Mackenzie, Liverpool, is specially noticeable for the richness, delicacy, and beauty of the colouring, and admirable grouping and general treatment, the solid gold ground showing off the floral beauties to the best advantage. Messrs. Blake & Mackenzie are adepts at this class of work, their productions standing almost alone in the United Kingdom.

THE very attractive calendar we have reproduced in photo-print on another page in this issue, is from a chromo-litho issued by Herr W. Gronau, Berlin. It is imperial quarto in size, the calendar occupying the blank panel. The colouring of the original is after the Japanese style and is remarkably bright and dainty in effect, while the execution is faultless in every respect.

AN engraved business card from Messrs. Turner, Turner & Co., Mile End-road, E., is tastefully designed, the name being in a flowing ribbon-scroll, and is admirably printed direct from plate on white enamelled card.

Messrs. Griffiths & Son, Birkenhead, are distinguishing themselves in marine chromo-lithography. A portrait of the ocean-greyhound, *The City of Paris,* which they have just turned out, is not only artistic and natural in drawing and treatment, but is a very fine example of the best style of the art from a technical point of view. It forms the centre of a double-demy show poster, and is certain to excite considerable attention as an art advertisement. Messrs. Griffiths & Son are to be congratulated and commended on the success of their efforts in producing "fine" work.

Messrs. Stoole & White, Blackfriargate, Hull, are turning out some excellent work in chromo-lithography. The office card calendars sent us, including one for themselves, are very tasteful and effective in design, the colour treatment is bright and harmonious, and the technical execution clean, clear, solid in impression, and shewing carefully finished work throughout.

Messrs. W. R. Royle & Son, of Newgate-street, E.C., send us some examples of recent productions in engraved work—business and invitation cards—designed as well as engraved by themselves, which are not only fresh and attractive, but admirably finished in every respect.

The prospectus of the German magazine *Gartenlaube*, published at Nürnberg, is cut in the shape of a book, with fine specimen illustrations in miniature in chromo-lithography, bright and effective in execution.

Trade Notes.

Amongst builders of lithographic printing machinery the firm of Messrs. S. Charlesworth & Co., Richmond Hill Ironworks, Oldham, stands deservedly high. They were amongst the very first to recognise that absolute rigidity was an important feature in the litho machine, without which perfect impression could not be secured. In their well-known "Advance" litho machine (illustrated on the third page of cover in this issue) they have managed to combine a handsome design with compactness, immense strength, and consequent durability and power to withstand heavy pressure, while running at a high rate of speed. Though so compactly built, every part of the machine is easily come-at-able, and the various parts are so well balanced with a view of resisting strains that there is absolutely no weak part in its construction. The care taken in this respect has no doubt been the means of securing for the "Advance" its present high reputation for perfect impression and accurate register with the requisite high rate of speed. Specimens of chromo work that we have seen done on Messrs. Charlesworth's machines sustain this reputation in every respect, and everywhere we hear the "Advance" spoken of in terms that do not belie its name. The inking and stone-damping arrangements are as perfect as long experience can make them, the inking and distributing power being apparently more than ample for the most exacting class of chromo work. In securing the requisite rigidity, the very best materials obtainable have invariably been selected, and this, with the thorough finish of every detail of workmanship, has no doubt tended to secure for the "Advance" its present reputation as one of the very best and most reliable litho machines in the market. They are also makers of all kinds of printers' machinery, steam engines, etc.

Carlisle Hours of Labour.—Messrs. Hudson Scott & Sons, lithographers, colour printers, etc., of this city, voluntarily announced on Tuesday, February 16th, 1892, that in future the hours of the workpeople would be 51 per week, instead of 54 as heretofore, and that there would be no corresponding reduction of wages. In the artistic department a still further reduction was made, from 50¾ to 45 hours per week. This having been granted in such a graceful manner, and without pressure on the part of the employés, an illuminated vote of thanks was accorded to each member of the firm, Mr. Benjamin Scott, Mayor of Carlisle, and to Mr. William Scott, signed by all the employés. The vote of thanks was handsomely bound in portfolio form, and presented on Friday, March 19th, the day of the entertainment and "jubilee" presentation to Mr. Joseph Glaister, foreman litho. printer, on the attainment of fifty years in the service of Messrs. Hudson Scott & Sons.

Messrs. Allbut & Daniel, lithographers, of Hanley, have set a good example, which would bear repeating, in reducing, unsolicited, the working hours of their employés to 52½ per week, commencing from April 2nd.

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TO LITHOGRAPHERS.—A thoroughly Practical Man desires re-engagement as Lithographic Foreman with firm doing high-class commercial work. Strict disciplinarian. Ten years in present situation.—"L.F.," British Lithographer office, Queen-street, Leicester.

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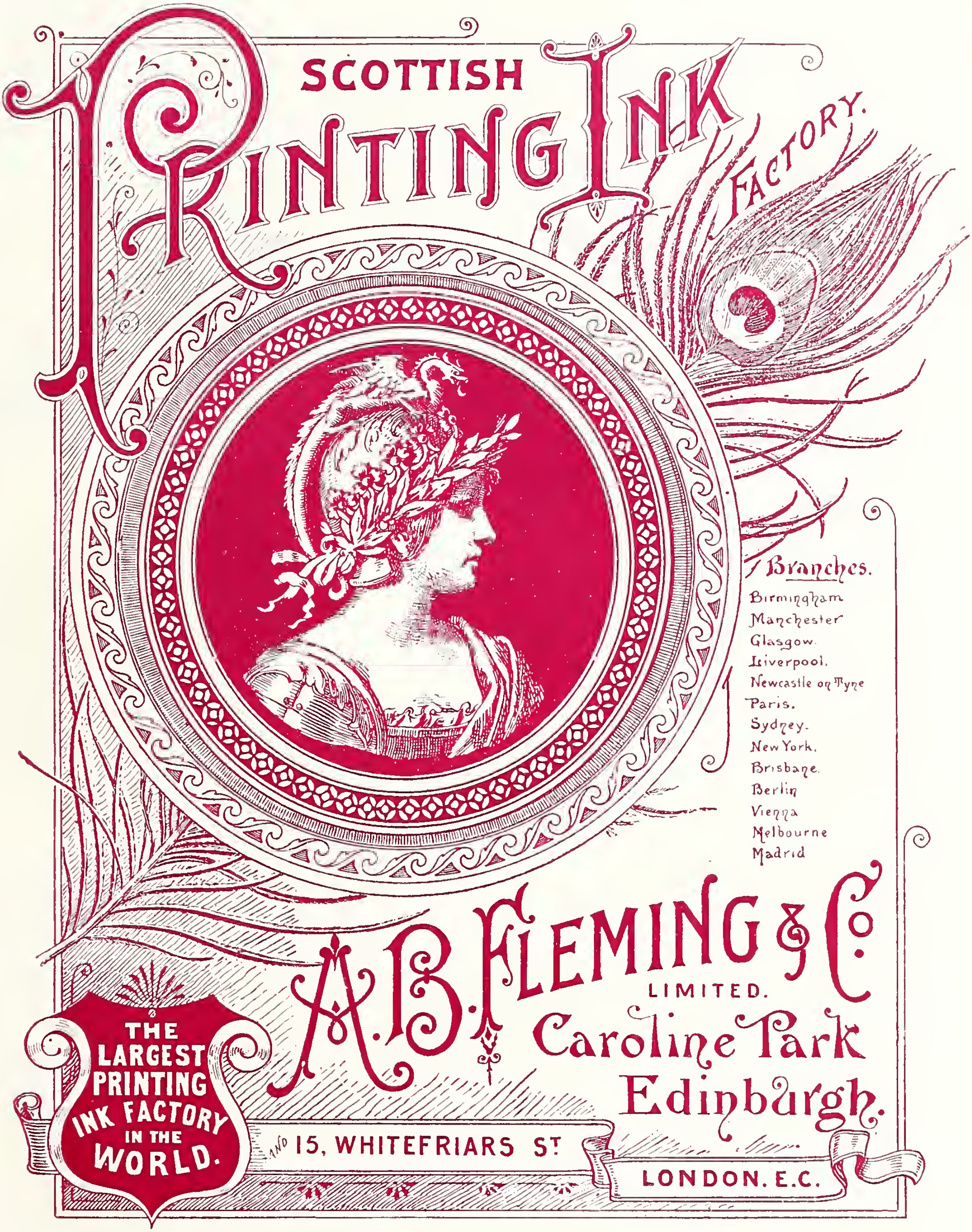

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THE BRITISH LITHOGRAPHER

A JOURNAL FOR LITHOGRAPHERS · ARTISTS · DRAUGHTSMEN · PHOTOTYPERS · STEEL & COPPER-PLATE · ENGRAVERS &c.

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B.L. Examination Papers, No. 4.

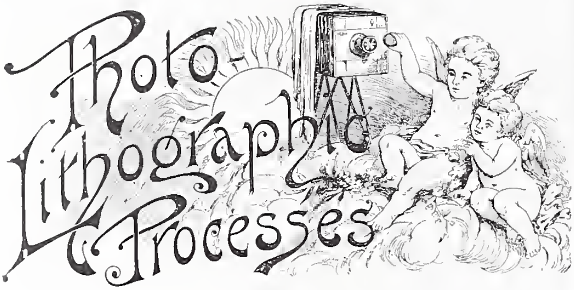
The result of the Second Competition, and the prize papers worked out, will be found at pp. 13 to 20 in this issue; and below we give the questions for the Fourth Competition. Conditions and prizes as before, and answers must be sent in to the Editor at Leicester on or before July 8th.

Elementary Grade.

1. What kind of roller do you prefer to print a full body on a polished stone? Give your reason.
2. Give your reason as to the advantage (if any) of transferring to a wet stone.
3. Describe the preparation of India paper for printing.
4. Why is it necessary to etch a chalk drawing upon stone? If any chemical action, explain it.
5. Your favourite method of rolling up a zinc plate.
6. Give a good remedy for preventing transfer paper working greasily by the artist.
7. How would you proceed to obtain a set-off by gelatine sheet?
8. What is the best remedy when the lines are firm yet the impression is pale?

Advanced Grade.

1. What in your estimation is the best method of transposition of black and white? Describe the process.
2. How would you test the quality of vermilion powder?
3. If too much strong or middle varnish has been added to ink, thus preventing free working, how would you remedy the same?
4. What is geranium-red? Draw a comparison between it and vermilion.
5. What order would you choose for positive colours to succeed each other in printing? Why?
6. Give *four* pigments that flake-white should not be used with. Why?
7. What is emerald-green a compound of? How far is this colour applicable to litho printing?
8. What properties should a ground possess for forming a tint on grained stone?



CHAPTER V.

An Australian Invention in Half-tone Lithography.

The last chapter revealed the fact that there are many ways of obtaining half-tone litho transfers; and in the present chapter it is intended to describe another method invented by an Australian. The description is given upon its own merits, for our readers to make the best use of. We have not seen any productions, nor have we heard of any quantity produced by this method.

The gelatine, first coat, is put on in the same manner as already described in chapter I., and consists of :—

Nelson's opaque gelatine	1-oz.
Water	7-oz.

The gelatine being allowed to dissolve for about two hours. The mixture is then raised to 100°F. (38°C.), and to it is added a mixture of :—

Chrome alum	2-gr.
Water	$\frac{1}{2}$-oz.
Tannin	$\frac{1}{2}$-gr.

After which the mixture is well strained and put into a dish, where it can be kept at 90°F. (32°C.), and paper coated with it. The gelatinised paper is dried, and in the dark room is sensitised by floating it for three minutes upon a bath of :—

Potassium bichromate	3-oz.
Water	80-oz.

The sensitised paper is dried at about 75°F. (24°C.), and is ready for the next operation.

Up to this point there does not seem to be the least novelty of treatment; on the whole, it may be considered old fashioned. But, after the drying, a great divergence steps in and revolutionises all previous modes of procedure.

The sensitised paper is next covered with black ink, just in the same way as it is usually covered completely with black ink after exposure, for rolling up. The ink used must be a good opaque one, and such that it will protect minute portions of the surface from the action of light, and, as it were, form a granulation of the surface. The following is the composition of a suitable ink :—

Beeswax	4-oz.
Spermaceti	1-oz.
Tallow	$\frac{1}{2}$-oz.
Lamp black	1-oz.
Good litho printing ink	3-oz.

The even facing of ink is put on in the old style by rolling a stone black, and running the transfer paper, face downwards, upon the blackened stone. The result should be that the paper receives a thin film of ink, through which the yellow tone of the composition is distinctly visible, and on closer examination the ink should be found to form a minute grain. By this means a granulation of the surface is obtained, and the subsequent processes are much the same as with other papers. The blackened transfer paper is exposed in the printing frame; the exposure must be measured by an actinometer, after which the transfer is removed, inked up by roller, sponge, or on a stone as above, and soaked for an hour in cold water. The transfer is gently rubbed with a soft pad of cotton wool, and the picture gradually developes. At the first attempt all the grain does not come clear, but by a repetition of soaking and rubbing gently the picture becomes entirely developed. The transfer is thoroughly dried and finally transferred to warm stone in the usual lithographic manner.

CHAPTER VI.

Improved Paper Process for Half-tone Lithography.

In chapter III. is given the process of papyrotint, popularly known as Husband's, and it is there given in its original form, but experimentalists have found that it requires considerable modification to bring it into a workable and reliable method. Before studying the present chapter it is necessary to go back to chapter III., and glance over the different stages in the preparation of these transfers. The process may be thus summarised :—

(1) Coating with a thick gelatine film.

(2) Drying at about 90°F. (32·2°C.)

(3) Sensitising with a mixture which subsequently causes a reticulation of the gelatine and image.

(4) Drying at 70°F. (21°C.), or higher to increase the reticulation.

(5) Exposure.

(6) Soaking in warm water, wherein the reticulation may be further increased.

(7) Inking up and hardening.

(8) Transferring to stone.

Having a clear tabulation of these points it can be more readily pointed out where it is necessary to make differences.

Thus, in stage 1 of the present improved process, the constitution of the gelatine coating is modified to consist of :—

Soft gelatine (Nelson's amber) ...	1-lb.
Borax	2-oz.
Saltpetre (potassium nitrate)	1-oz.
Sugar	8-oz.

The gelatine is soaked in a large quantity of water for about twenty-four hours, when the surplus water

is drained off. [A good gelatine will absorb four times its weight of water in swelling.] The moisture thus incorporated in the gelatine is quite sufficient to dissolve the other constituents, viz:—borax, sugar, and saltpetre. The paper is coated with this mixture twice, to secure uniformity and a thick film, and may be dried at any temperature above 60°F. (15·5°C.), but not exceeding 100°F. (37·7°C.)

The paper thus prepared resembles the half-tone litho transfer paper supplied by Messrs. Winstone, of London, and is in a condition to keep almost indefinitely. The thickness of the gelatine film will cause the paper prepared in Husband's process to curl up so much as to render it very difficult to sensitise it, and it is necessary to clamp it down for sensitising.

In stage 3 another considerable modification should be adopted by making the sensitising solution as follows:—

Bichromate of soda	2-oz.
Common salt (NaCl)	½-oz.
Red ferricyanide of potassium ...	1-oz.
Water	20-oz.

Having coated the paper in normal light by immersion in the above bath for about five minutes, the paper is dried in a drying cupboard at a temperature of from 90°F. (32·2°C.) to 120°F. (48·8°C.), increasing the heat to increase the reticulation. Care should be taken never to go higher than 130°F. (54·4°C.), because at little less than 150°F. (65·5°C.) gelatine melts.

Stages 5, 6, and 7 are much the same as for Husband's process, and quite applicable to the present modified process. In stage 7, however, the materials used for hardening are different. After inking the transfer in Husband's process, it is immersed in tannin and potassium bichromate bath. In the present process the tannin is replaced by sulphate of iron, and the whole bath should consist of:—

Potassium bichromate	1-oz.
Water	20-oz.
Sulphate of iron [$Fe_2(So_4)_3$]	¼-oz.

Lastly, in stage 8, the proportion of oxalic acid in the damping water, with which the back of the transfer is damped before putting to stone just as with autograph transfers, should be in the proportion of 1 oxalic acid to 80 water.

In reviewing these processes of obtaining a granulation in the finished litho transfer, it is necessary to bear in mind three principles over and above all the details which have already been given.

First:—The first coating of gelatine must be thick, and should contain saltpetre.

Second:—The sensitiser should not only contain the red ferricyanide of potassium, but should be acid to test; the acidity being given by small additions of either acetic, citric, or tartaric acid.

Third:—The sensitised paper must be dried at a high temperature.

And the work is improved by immersing the print, after exposure, in a strong solution of borax, the heat of which can be gradually raised until the reticulation is of a satisfactory coarseness.

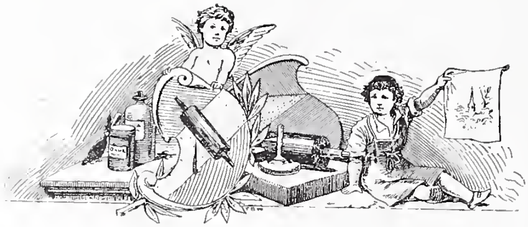
A recent discovery in connection with photo-litho transfers is of considerable importance. In most instances when a photo-litho transfer, like all other lithographic transfers, has been used it is done with. But by omitting to soak a transfer in tannin or sulphate of iron, as already described, it is left in such a condition as to render it capable of being used over and over again, being kept as an original.

[*To be continued.*]

Messrs. Leslie E. Clift & Co., successors to the late firm of Dawson, Wilmer & Clift, of 35 Essex-street, Strand, have recently—to be nearer to their photo-engraving works in Red Lion-yard—removed their offices and wood-engraving department to 1 Holborn-place, High Holborn, W.C., the staff and management remaining in all respects the same as under the old firm name. The new offices are very commodious, central, and very convenient for the trade as well as for private clients. Messrs. Leslie E. Clift & Co. are wood-engravers, photo-engravers in "line" and "half-tone," and from special grained papers. Specimens of each class are before us as we write. In respect of woodcut work, first-class quality has always been an essential feature with the firm, and the fact that they work for most of the large engineers in the country is sufficient evidence that in this department they hold their own. The firm has made a speciality of photography of machinery, and as the principal of the firm is himself a thoroughly-trained engineer, details which would escape the ordinary engraver are carefully attended to and properly represented. In "line zinco" their specimens speak for themselves, and for cleanness of line and thorough etching they would be difficult to surpass. In "process engraving in half-tone," their work compares favourably with any other in the trade. The grained paper department the firm has given special attention to. The use of grained paper as a medium for drawing has been successfully brought by them under the notice of the printing trade and publishing world, and has led to its adoption for pictorial representation where line or half-tone zincos would not be suitable. In every class of work they seem to spare no pains to attain as near to perfection as possible, and the results are uniformly excellent. We were privileged, recently, to go over the works of the firm, and were struck with the compactness and suitability of all the arrangements. Complete electrical plant has been established, the studios are independent of daylight and the whole arrangements are made with the object of turning out a large amount of work efficiently and quickly. The firm is known in the trade for the good feeling which exists between it and its staff.

A Prize for Lithographic Writers.

Half-a-guinea is offered for the best plain commercial circular written by a litho writer. To be the exact size of our printed page of reading matter. Wording left to the competitors. To be written on transfer paper. The prize specimen will be printed, with the writer's name attached, as a supplement to the next issue of the B.L. Specimens must be sent in not later than July 4th.



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· SPECIAL LECTURES ·
· · ON PHOTO-MECHANICAL PROCESSES. · ·

THE course of lectures on lithography at the Manchester Technical School, has been considerably enhanced in value by a series of six lectures, delivered on March 10th, 17th, 24th, 31st, April 7th and 14th, by Mr. W. T. Wilkinson, the specialist, and author of "Photo-Engraving and Collotype." The lectures were open free to all members of the printing classes, and a fee was charged to the public. The series comprised detailed descriptions and practical illustrations of all the photo-mechanical printing processes, commencing with the negative.

The lecturer exhibited a number of negatives prepared by the wet collodion and dry plate processes, and particularly emphasised the fact that for clearness of negative, absence of veil, for rapidity and cheapness of production, the wet collodion plate is far superior to the dry plate. Such an assertion was fully borne out in a striking manner by the negatives exhibited, and for all processes in which line work is the main object in view it might almost be said that the wet collodion plate is alone successful. There is, of course, a reservation in favour of half-tone work, being done as well from dry plates.

This description of the negative was thoroughly demonstrated on Saturday afternoon, April 16th, at Mr. Wilkinson's studio, by the practical illustration of the entire preparation of a wet collodion plate and negative, and a dry plate negative.

The second lecture was devoted to the zinc etching process of work in line, and it was again fully illustrated by the exhibition of negatives, prints on the zinc, coating the zinc, the exposing frame, and inking of the plate.

In this lecture a number of valuable hints, the result of years of experience, were given by the lecturer, which could not fail to be appreciated by those interested in the subject. One point, which has suggested itself to others, was fully proved; and it is an advantage to know that instead of using specially prepared litho transfer ink for rolling up the plate, a good printing ink will serve the purpose better.

In the third lecture photo-lithography was fully dealt with, and many little points where failures have often arisen were so thoroughly explained that similar faults, except through carelessness, could not occur again. The lecturer laid considerable stress on the present opportunity which manipulators have of purchasing ready-coated paper, which only requires sensitising previous to exposure. He mentioned both Prof. Husnik's paper and paper supplied for the carbon process as being sufficiently coated with gelatine for this purpose.

The fourth lecture was devoted to a number of processes, including photo-lithography in half-tone, the swelled gelatine process, the wash-out process, and Woodburytype. And it was at this point the lecturer dwelt minutely upon gelatine, describing its origin and treatment. His experience had proved that gelatine of the proper nature was difficult to obtain, but that the gelatine prepared by F. F. Creutz, which absorbs five times its weight of water at 66°F. (13·3°C), is by far the best in the market.

In the fifth lecture, the half-tone zinc etching was thoroughly discussed. The lecturer exhibited samples of cross-line screens which he had purchased from two American firms, and had since sealed them by cementing another glass plate on the film side with the transparent material, Canada balsam. He advised operators to use Nicholls' prepared zinc, as it obviates a lot of labour, and gives a surface upon which the films can at once be poured previous to exposure.

The last lecture was devoted to collotype, and was fully illustrated with the practical demonstration of printing in a litho press, fitted with a bed-plate specially designed for the purpose by Mr. Harrap, the lecturer in lithography. The lecturer cautioned his hearers against using crystal silicate of soda for the substratum; it must be syrupy silicate of a certain consistence as near thin treacle as possible. He then dwelt upon the reticulation of the film, from which transfers can be taken and put to stone and printed as half-tone lithographs. In his final remarks, he launched some very severe arrows at the impatient and careless amateur, who, because he does not attain the height of success at the first venture, throws the instructions on one side and vows never to touch the process again. Not only does this admonition apply to photo-mechanical printing processes, but it applies with equal force to many lithographic processes, especially to the new zinc plates. On this point, our readers may learn from the testimony of a good operator, given in the correspondence of this journal, that zinc plates are most successfully used for all photo-lithographic processes, instead of using paper to receive the gelatine and sensitising films.

LEICESTER CLASS.

THE Leicester class completed the session with the lecture on April 27th, when twenty-eight students were present, together with Mr. W. H. Lead, the chairman of committee, Messrs. Keightley and Langton, and Mr. T. B. Widdowson, the hon. sec. The course of lectures has been a most interesting and practical one, the careful and thorough teaching of Mr. Hall having received the unfailing attention of the students. The attendance at the class meetings has been very good, and everything points to a large number of successes at the May examination, apart from the increased amount of information in the minds of so many workers which must exert a beneficial influence on the trade.

The late Andrew Maclure.

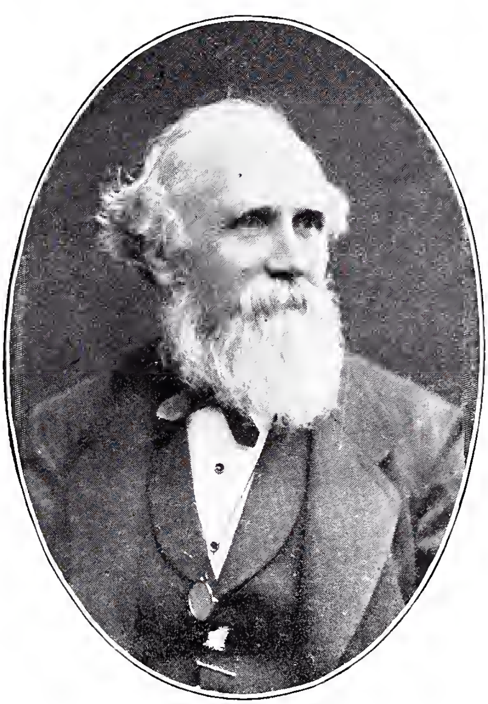
OUR PORTRAIT GALLERY.

The late Mr. Andrew Maclure.

THE subject for "Our Portrait Gallery" this issue is the late Mr. Andrew Maclure, of the well-known firm of Maclure and McDonald, of London and Glasgow. The conjunction of this admirable portrait (taken in his later years), with a slight sketch of his life by one who knew him, will, we trust, not be unacceptable to the lithographic profession, of which he was an honoured member.

Mr. Maclure was born in Glasgow, and served his apprenticeship with Mr. James Miller, of the same place, one of the earliest practitioners of the lithographic art in Glasgow, and after finishing it, he went to Edinburgh and London, acquiring further experience and knowledge of his profession. On his returning to Glasgow in 1836 he began business, and entered into partnership with Mr. A. McDonald, trading under the title of Messrs. Maclure and McDonald, and continued several years there. In 1845 it was suggested to still further extend their business, and it was arranged that Mr. Maclure, having had some previous knowledge of the requirements of the art in London, should open a place there, which he did, commencing an establishment in Leicester-square, London, where the character and style of the firm's work soon made considerable mark in the then commercial lithography. Finding themselves somewhat out of the ordinary channels of commercial business, the establishment was removed to Bow-churchyard, where it developed itself so rapidly as to make it again necessary to remove to larger premises in Wallbrook. Here the firm remained for a number of years, increasing until even Wallbrook was inadequate for the extent of their business. Then they finally acquired a lease of ground in the locality now called Queen Victoria-street, where they built the large and commanding premises now in existence, and suitable for their requirements, Mr. Maclure remaining the managing partner until his death in 1885, when the business was carried on by his two sons under the name of Maclure & Co.

Mr. Maclure was for nearly forty years connected with the business in London, and during that time was an active and enterprising member of it. He was always actuated by a strong desire to discover and carry out any improvements in the methods of working the lithographic art. He introduced into this country the first lithographic *machine* called the "Siegel," which was brought from Berlin, while his skill as a draughtsman enabled him to give adequate expression to the artistic wishes of the extensive *clientèle* who favoured the firm with their commissions. His artistic abilities were of a varied character and almost unrivalled in his day, ranging from a chalk landscape to a chalk portrait, and even in pen work and sketching he had a skill of no ordinary kind. In portraiture he may not have had the finish of his contemporary Bouniet, the French artist, but there was a force and character about his work in this line which far surpassed Bouniet's work.



A. McDONALD.

To speak now of his numerous personal accomplishments which endeared him to a large circle of friends. He was a great patron of all athletic sports, and particularly those of the Scottish games held annually at Holland House. He was also one of the first to take part in the volunteer movement, and entered heartily into it, and boasted he was a full private, especially about the waist! He may be called the founder of the London Scottish; he was one of the founders of the Caledonian Society of London, and a member of all the charitable Scottish institutions in London. Nobody ever applied to him for help in vain. Besides being one of the soundest and kindest of men, he was amazingly humourous, and the humour and conception of many of his

stories are well remembered by those of his friends who were privileged to enjoy his friendship. Had his skill in the direction of wit and humour been given to the world volumes would have been filled, but the world was too crowded and too busy in his day to preserve such creations. He was a magnificent man, standing six feet two in height. No artist of this time had such sinews and muscles, or such an ample chest and perfect lungs. Had he lived in classic times he would have been made an hero, and his praises sung in Homeric verse. Many of his countrymen will no doubt call to memory, with pride, the stalwart frame of Maclure in the regimentals of the London Scottish. He died very suddenly in 1885, at the house of his son-in-law, at Mowgie Castle, Perthshire, much regretted by numerous friends.—W.

Harmonious Colouring.

From the title our readers may be led to expect a careful and complete dissertation upon harmonious colouring and how it may be obtained; but at the outset the mind must be disabused of such a conclusion, for what is about to be dealt with is in reality a wonderfully ingenious chart of colours, arranged in octaves and spectra, shewing many thousands of different tones, and what is the more valuable, each colour is so minutely described that it can be prepared in any quantities from the weight formula given. Such is a general view of the plan of the undertaking, and it now remains to go more into the detail to shew the extreme ingenuity and perseverance which have been displayed in the compilation.

The word "harmonious" in the title has a double bearing, having been applied to the harmony of colour and to the harmony of sound and light. Indirectly, sound and colour are brought into a species of comparison, and upon the musical notes and octaves a scheme of colouring has been built up, each note having its counterpart in the colour scheme, whether high or low in tone, and each chord of the octave having its representative colour value. Such minute comparisons will readily shew that a colour chart to be complete must include a vast number of shades. Thus the whole scheme is divided into eighteen or nineteen octaves, commencing with the darkest shades at the foot of the page and becoming lighter by one half in each of nineteen consecutive steps towards the top of the page. From left to right on the "primary" page, the colours commence with the red on the left and gradually increase in rapidity of vibration, just as the notes do in ascending a musical scale, until the final colour—violet—of the visible spectrum is reached.

Each double page in this voluminous chart includes one complete range, and is complete in itself. There are twenty-four such complete ranges. Each range consists of twenty-four chords or colour representatives, which stretch in a horizontal line from left to right across the two open pages, and these twenty-four chords are repeated in vertical lines in eighteen octaves of colour tones. It will be found from multiplication that each range has 432 distinct colours or shades, and that the whole three volumes of charts contain in their twenty-four ranges about 6,000 different colour combinations, each one of which can be prepared by using the weight of pigments given under it, if the same pigments are used as given at the commencement of the scheme as standard colours.

It is easy to judge that Mr. C. H. Wilkinson must have occupied years with his painstaking work to compile these elaborate charts; and it is claimed that they possess inestimable value to designers, decorators, and colour mixers alike. The compiler claims that in any range the colours picked from any portion must harmonise; and by careful management in following the colour from one range to another, similar harmonies can be set up. Certainly, this seems scarcely possible, since *all* colours are included in these charts, and can be brought on this system into direct contrast. The compiler, in all probability, has a system by which the selection of harmonies is made, and such system will, undoubtedly, be found in the work which we have endeavoured to describe.

Mr. Seymour Haden, in writing to the *Magazine of Art* in 1889, upon painters doing their own etchings, ridicules the idea that painters have not time to go in for it, and says that he had himself etched over two hundred plates, and that he looks upon them as property and a source of income. In conclusion he remarks:—"I do not say that they were done with this view" (of making an income) "for they were *not;* but that is the outcome of a practice which the painter would, if he were not as stupid as he is obstinate, hasten to emulate." There is a lot more truth in this remark than appears on the surface, for one feature of the painter's (artist's) character is to throw cold water on every mechanical means of art production, as though there were not as much skill and keenness of perception required in such productions as the thousands of ill-defined, yea, and badly-drawn daubs which pass muster as artistic productions and marvellous conceptions of atmospheric or other effects. Little does the artist think that the main portion of his notoriety depends upon these mechanical means of producing his works, and many people of to-day delight just as much in a photogravure, engraving, or etching, as they do in the coloured originals. It is more often the subject and its true delineation which are the attraction rather than the attempted colour effects. That being so, a good copy of the subject by mechanical means gives as much pleasure as the original, and to obtain a good copy requires the exercise of a large amount of careful manipulation.

Mr. A. H. Morgan, chromo-lithographic artist, 3 Dyer's-buildings, Holborn, announces that he has taken Mr. R. G. H. Atkins as partner, and that the business will in future be carried on under the title of Morgan & Atkins.

We hear that Walter Crane has designs in hand for other Insurance Society showcards, now being produced in Edinburgh.

BY CHARLES HARRAP.

CHAPTER III.—*Continued.*

SUBSTITUTES FOR LITHOGRAPHIC STONE.

II.—THE PATENT METALLOGRAPHIC PLATES.

THESE metallographic plates were brought before the public only a little time after those of Messrs. Layton Brothers, and we are given to understand that their sale has been very limited in England at least. But a treatise on this subject would be quite incomplete without a full description of the patent, more especially because it has so much in common with the treatment of the Hull Zincplate Co.'s plates, and as shewing one of the attempts to make a substitute for stone, which has so far failed to claim popular favour.

The claims advanced for these plates were that the treatment was as nearly similar to stone as was possible with such a different basis. The patentees asserted that the plates were of a special texture of metal, unlike ordinary zinc and other zinc-plate substitutes having a coating on the surface, which is easily spoiled, and wants frequent re-coating. Although these claims seem to include all that is required, yet it should not be overlooked that the plates were of a dark colour, and were, therefore, not at all pleasant for the draughtsman to work upon. Again, the "surface" of the plate was subject to destruction in the course of severe etching, and frequently the fine work was considerably undermined.

As with the Hull Company's plates, so with these, there were two fluids, called respectively "A" and "B," which were supplied by the patentees, and were necessary throughout the whole operations connected with them. But with these plates, the etching solution and coating composition were not supplied, as sufficient instructions were given with the plates to render them unnecessary. Thus, to re-prepare, or re-coat a plate, the process may be dealt with in four stages as follows:—

(1) Wet the plate with water, sprinkle on some good turpentine, and wash out strongly until the drawing disappears.

(2) Wash the plate well under running water with soft rag or sponge, and wipe or fan the plate dry. Then with a sponge, kept exclusively for the purpose, apply the fluid "A" until the grease of the drawing is neutralised, and the fluid no longer retreats from the old work on the plate. The plate is again washed thoroughly under running water, and is well rubbed during the washing with clean rag or sponge. It is then dried.

(3) With fluid "B" the plate is next washed, while the fluid is kept upon the plate for at least five minutes; after which every particle of disengaged material is thoroughly cleansed from the plate under running water, and the plate is dried.

(4) Finally fluid "B" is again sponged well over the plate, and allowed to stand upon its surface for a few minutes. It is then washed and dried as before, and is ready for use.

It will be thus seen that these plates could be constantly used over and over again without further treatment by the patentees. The whole cost of re-preparing being in the time and charges for the fluids "A" and "B."

The ordinary manipulation of these plates was so like stone work that it needs but a very brief description. The surface of the plates was finely grained, not in different degrees of granulation, but just as a fine grained stone, and the draughtsman could use either pen, brush, or chalk upon them. Transfers were put down as on damp stone, or if damped transfers were used, the plates were not warmed.

TO PREPARE FOR PROVING.

Transfers could be put down with ordinary good retransfer ink, but the patentees recommended the use of their special transfer ink. If any faults appeared in the transfer when down, they could be remedied at once by a draughtsman. The work was then etched with a mixture of six drops of *concentrated* phosphoric acid, to one tablespoonful of good newly-made gum. This procedure was applicable to chalk as well as ink drawings or transfers. The gum and acid mixture would be prepared some time before use, to allow the acid to get thoroughly mixed. Then when the etching compound had dried on the plate, it was washed off, the work was carefully brought up with a soft rag and good retransfer ink, and was proceeded with as with stone. The plate was cleaned up by using a stick of charcoal and water to remove the specks of dirt, and a scraper to finally clear the lines. In obstinate cases cuttlefish bone or chalk might be used to clear dirt away. It was always better after either of these operations, to put on a little of the fluid "B" with a brush, and allow it to stand for a few minutes, then wash off. In the ordinary final etching given to a plate after cleaning up, *thin* phosphoric acid (in water) should have been used. If the plate were to be printed at the machine, this final etching should have been stronger, and allowed to stay on the plate longer, the work, of course, having been previously dusted with French chalk.

For "washing out," turpentine was used as for stone work; and if in printing the edges became "dirty," they were to be well covered with strong gum, taking care that the gum did not cover the drawing.

Above all things there must have been cleanliness of rags and sponges, and plenty of water in the whole process to be successful. The fluids were to be kept distinct, separate sponges used for each, and always

well shaken previous to using. The plates were to be kept covered up, and before using, well dusted to remove specks. For printing, either in the hand press or machine, the same remarks applied as already given in the description of the Hull Company's plates, concerning the mounting upon proper beds or improvised supports.

To Make Additions or Alterations to Work.

The plate was carefully rubbed with a stick of soft charcoal until the incorrect drawing was removed, or the surface just abrased. The dust was washed off well and the plate dried.

On the parts thus prepared, a small quantity of fluid "B" was put with a brush, and allowed to stand five minutes. After well washing, fluid "B" was to be brushed on a second time, then washed, dried, and the alteration or addition made. Always after such corrections, the new work was etched with gum and phosphoric acid, as for a new drawing.

To Preserve the Plates with Work on.

The directions given already for the Hull Company's plates applied equally to these, and were to be carried out as there described. The patentees, however, recommended the use of their preserving ink. It may be better to do so, but any good preserving ink must answer the same purpose, without needless expense.

Engraving upon the Plates.

Not only could these plates be used for all the ordinary lithographic purposes, but the almost obsolete process of stone engraving could also be practised upon them. It is not intended here to dwell upon stone engraving, as that will be fully treated in a subsequent chapter; it is sufficient to note that by treating these plates with a mixture of ten drops concentrated phosphoric acid to a tablespoonful of gum, which was allowed to dry on, the "grounding" could be rubbed in. The colour of the grounding to be according to the engraver's taste, but must be free from grease. The engraving was executed with the fine engraver's needles, just sufficient to make the zinc shew through brightly; after which, linseed oil, etc., was allowed to flow over the plate and fill in the engraving. The plate was well wiped, and the grounding washed off, etched and rolled up firmly, but gradually. By this means, drawings, equal in execution to many "plate" engravings, could be printed from the machine.

III.—The Litho-Plate.

These plates were almost the pioneers of zinc-plate substitutes, and during the eight years of their manufacture were well patronised, especially at the time of their introduction. It was certainly a novelty, and as such was eagerly taken up by large firms. But the same forces which had to be overcome then are still at work, although, perhaps, in a less degree, in the fact that printers' customs and practices have to be slightly altered to meet the new conditions of plate printing, and it has been proved that this is a very large element which has to be allowed for with any new process. Notwithstanding this difficulty, these plates have had a fairly successful career, which may be gathered from the fact that the Hull Zincplate Company considered it to their advantage to buy up the patent and thus leave the field entirely clear of rivals. The final transfer of this patent took place in February, 1892, and thus brought to a close the separate manufacture of a good quality of zinc-plate substitute. It is the writer's opinion that any zinc-plate substitute which will produce work as well as these litho-plates have done, and which require a simpler mode of preparation in printing, should be the desideratum of all printers.

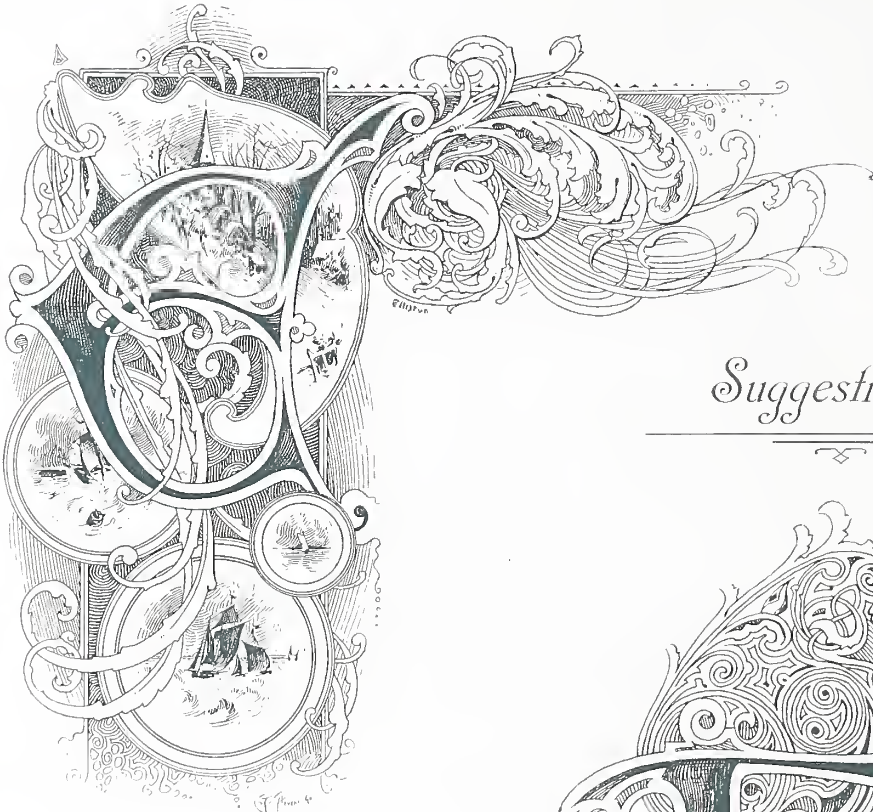
This plate was manufactured by depositing upon the surface of a thin zinc sheet a calcareous layer, having a composition nearly similar to—if not actually prepared from—lithographic stone. This layer was very thin, and it was surprising how roughly the plates could be handled without ever causing the surface to scale or chip off.

After the initial stages of preparation, nothing could be simpler or easier than working from these plates. The printer's ink could be thin, the rolling up could be done by any amateur, and the impressions always shewed a quality which is seldom obtained from stone. Copperplate engravings, chalk drawings, ordinary manuscript—all fared the same, and gave first-class results. But the drawbacks to the everyday use of these plates, as with others, are the use of proper plate beds in the machines and presses, the initial stages of rolling up the work, the difficulties in alterations and clearing the plates, the sending of plates back to the makers for re-preparing, or the use of patent chemical decoctions which the printer does not readily understand or know how to regulate in practice.

Although these plates are no longer in the market, it is well to dwell a little on their treatment, as it opens up the field of enquiry with respect to other plates, and may lead to a more ready understanding of the chemicals which are used in these plate processes.

Thus, when the work was put upon the plate, either by transfer or drawing, the whole was covered thinly with a mixture of potassium bichromate and gum, and allowed to dry. The ink was then washed out with turpentine, without the use of any water, and thereby leaving the gum undisturbed. The whole plate was then rolled in solid black all over, and when quite solid, water was sprinkled on; the rolling continued until the design was rolled up quite clearly. Finally, the plate was etched with a mixture of one part strong phosphoric acid (Sp. Gr. 1·5), one part water, and sixty parts good gum. This latter mixture was known as the etching solution, and is in all probability the same etching solution which is recommended for most zinc-plate substitutes. When alterations were to be made on these plates, the original work was cleaned out with pure turpentine, then the parts were gone over with a mixture of 2½-ozs. of the strongest caustic soda in a pint of distilled water. By this means the grease was eradicated, and it was plainly seen that when the grease was thoroughly neutralised this solution was not repulsed from the old lines of the work. Having cleaned this mixture off with plenty of water, there were two courses open: firstly, to put on a little diluted citric acid; or secondly, to put on some of the etching solution previously described, followed by a wash of weak citric acid. After either of these the plates were well washed, dried, and proceeded with as if they were new plates. This same

Supplement to "The British Lithographer."



Suggestions.

Initials · for · Illuminating.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

Suggestions.

Initials

for

Illuminating.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

process was followed when it was required to clear all the work off a plate and use it for a new drawing.

Similar safeguards were observed with these plates as with others, as, when the plate shewed a brightness by the coating being scratched or worn off, a thin coating of the etching solution was brushed on, and the defect thus remedied. There was an advantage with these plates which is not observable in others, and that was that the artist could make corrections in his work by cleaning out incorrect work with a brush and benzine or turpentine.

Sufficient has been said to shew how later patents run much on the same lines, and that the differences, though small, are mainly directed to rendering the initial stages of preparation simpler and more in conformity with the usages of lithographic printing.

[To be continued.]

Obituary: John C. Moss.

THE man who practically invented photo-engraving as a commercial process died of heart disease, in Brooklyn, N.Y., on April 8th. John Calvin Moss was born in Washington County, Pa., in 1838. When about seventeen he began to learn printing in a Philadelphia office. He thought that his talent for drawing might in time lead him to a higher plane of labour. Before he was nineteen he married Mary A. Bryant, who afterwards became his zealous co-worker in the experiments which resulted in the discovery of his method of photo-engraving. His investigations began in 1858, but his means were so limited that he could not even purchase a galvanic battery. He overcame this obstacle by constructing one. He became a student in photographic chemistry, and studied carefully the experiments of Daguerre and his predecessors. He and his wife were at times devoid of means with which to purchase the necessities of life during the course of their experiments, but their labours were at last rewarded.

They went to New York in 1863, and in 1871 Mr. Moss organised the Actinic Engraving Company, which was dissolved the following year. A friend gave him money to organise a new company, which he called the Photo-Engraving Company. In 1880 he withdrew from this and formed the present Moss Engraving Company, which employs two hundred people.

It is related of Mr. Moss and his indomitable wife that their first order for a printing plate was to bring them $40 cash if the work proved satisfactory. Despite all of their efforts it would not come right. Finally, one morning at two o'clock, Mr. Moss laid down upon his bed exhausted and fell asleep. But his wife persevered, and at breakfast showed him the successful result of her work. The process in which success was thus achieved is the swelled gelatine method.

Before Mr. Moss made his successful experiments, wood engraving and steel engraving were the approved methods for illustrating magazines and the like. Of course Mr. Moss' first success was only a step in the right direction, and his whole life thereafter was devoted to improving the art which he made practicable.

The Art of Illuminating.

THE monk of old, dead to mundane interests, found occupation for hands and mind in the elaboration of laborious MSS. Comparatively few people, perhaps, who regard with curiosity the specimens of this monkish art preserved in our public institutions, have any conception of the difficulties under which the old churchmen carried out their labours of love. To commence with, the knowledge of drawing, as we understand it, was slight; the eleventh or twelfth century draughtsman had before him none of those rules which guide the modern student. In this respect alone the modern board-school boy is far ahead of the monk. We see the result of this lack of knowledge in the absence of perspective, and the consequent hardness and flatness of their work. But there was a greater difficulty which attended the path of the old illuminator, in the fact that he had not only to prepare his own colours, but to find the pigments, the earths and natural dyes wherewith to make them; under these circumstances, the brightness which his work exhibits is remarkable, and its endurance even more so. The modern illuminator should be, as he undoubtedly is, able to show much greater technical knowledge, and a delicacy of treatment to which, owing to the circumstances we name, his mediæval prototype could not possibly attain; but the question arises naturally in one's mind, will his work show the same endurance? Those delicate gradations and pale tints which make up so beautiful a whole when in combination, will they stand the test of years—say a century or two? Many of our most beautiful colours, unfortunately, are as fugitive as the joys of that life which the old monk sought to evade. But this perhaps is not to be regretted altogether. This is the age of testimonials, presentation addresses, and what not. If all these—that is, the illuminated record of them—were based upon the same enduring lines as the labours of the monkish scribe, it would possess a terror for the descendants of public men that would render life not worth living. Everyone whose ancestors took up any public position would have to possess his private muniment room, even as the bravo of the Great West in recent times is supposed to have established his own private cemetery for the victims of his violence. Nevertheless, the art of the modern illuminator is a beautiful thing. The effect secured in the different styles is really admirable. Illuminators sometimes lose sight of the fact that their art is subject to the same laws as regards treatment as are those of other works of the painter which we distinguish as "pictures." An illumination intended for close view, as in the form of a book, demands a more solid and at the same time more minute treatment than that which is intended to be viewed upon the wall from a distance of six or eight feet; whilst the latter, to excite full admiration, calls for a transparency and reflective brilliance in colouring, united with boldness of character, that may be excusably absent in the former. The illuminator, to attain to any rank, must be an artist in feeling, conception, and execution.

Lithographic Technical Teachers.

Walter Layton Wilson,

Technical Lecturer at the Polytechnic Institution, London.

The subject of the present sketch was born in London in 1851, and at the age of fifteen, was apprenticed to Messrs. Waterlow & Sons, the well-known firm of stationers and printers, serving his time in the Artists' department, with a most creditable and successful result. Mr. Wilson's grandfather was also a faithful assistant to the same firm for a period of nearly fifty years, and he is also a nephew of one of the partners (Mr. Layton) of the firm of Waterlow Brothers & Layton, of Birchin-lane.

In 1871, Mr. Wilson entered a West-end firm of printers and lithographers, where he remained for over 10 years, leaving at the expiration of that term for the purpose of accepting a partnership in a City firm, which, being ultimately formed into a company, retained the valuable services of Mr. Wilson at the head of affairs.

From almost his earliest initiation into the art of lithography, Mr. Wilson was impressed with the need which existed for technical instruction to be imparted to the pupils and apprentices in the various branches of lithography, in order that an all-round and general knowledge should be received; his own experience was of a nature to prove to what an extent division of labour led to a deficiency of practical knowledge, and he determined to endeavour to apply a remedy to the situation. With this worthy and laudable object in view, some eight years ago he established a Lithographic Class at the Polytechnic Institute, Regent-street, W., and which he has carried on with a considerable degree of success throughout that interval of time, with the exception of one short intermission, the occasion of which was a domestic bereavement, no less indeed than the death of his wife, who was the only daughter of the late Henry Cockburn, of Lamb's Conduit-street, and whom he married in 1874.

Walter Layton Wilson.

This class is still flourishing, and the number of pupils is constantly increasing, while the result of last session's examination was extremely gratifying to all concerned, the silver medal and other prizes being awarded to several students who had received the benefit of Mr. Wilson's instructions on the practical and general knowledge of lithography. In so far as the subject of our sketch has endeavoured to aid the necessary and worthy cause of technical knowledge, he deserves the thanks of the entire trade.

Fixing China Ink.—The *Bulletin de l'Imprimerie* gives the following process for fixing china ink in drawing or tracing:—Rub the ink in a solution of glycerine and bichromate of potash, and as soon as the drawing made with this ink is finished expose it to the light for four or five hours. The glycerine dissolves the gelatinous part entering into the composition of the china ink, and as a consequence causes its combination with the chromate. It causes, moreover, the decomposition of this salt, and its transformation into a chromate which becomes intimately united to the gelatinous matter. The mixture to be used is a solution of two or three per cent. of bichromate, adding one drop of glycerine at twenty-four per cent. to five drops of the solution. The ink thus obtained does not oxidize the metals and is as easily used as the ordinary china ink.

A number of the most representative lithographing firms of New York have decided upon combining together as the American Lithographic Company. They include houses doing several classes of work, notably those whose chief business is the trade in cigar-box labels, and it is intended to distribute the contracts secured between the various houses best adapted for the special class of work required, and to confine each house to its own speciality.

Lithographic stone has been recently discovered by Professor Calvin, of Iowa State University, in a cave near Springville, Lawrence Co,. Ind. The length of the ledge is 1,200 yards, 10-ft. in thickness, but its extent into the hills is uncertain; the quality is, however, very fine.

Foreign Competition.

The *Lithographic Art Journal* of America, in a few remarks upon foreign competition, declares that the imposition of a 35 per cent. tariff upon imported lithographs just about brings the price of imported goods up to the price of their home productions.

On this side of the world, we are accustomed to look across the Atlantic for cheap printing, and it is often a point of discussion how it is that American lithographs are utilised in this country, if it be true, as shewn by their own admission, that their cost of production, without freight, is at least thirty-five per cent. greater than in Europe. The possible explanation of American posters being used in this country may arise from a system of speculative printing, hy which a larger supply is printed than is required or used up in America. The remainder may be supplied to British advertisers at almost a nominal rate. This does not apply to all cases. Of course, we know there is not a very large amount of British printing done in America, but curiously enough the very printing which we have been led to believe was done in America and from thence supplied to England, is to a large extent done elsewhere.

Cigar manufacturers tell us that they get all their labels from America, and that neither England nor Germany can compete in quality—price being no object. Yet our contemporary crosses swords with the administration of the tariff law on this very point of the importation (into America) of cigar labels. To quote his own words will perhaps be more satisfactory than a paraphrase. The article reads thus :—"But our customs authorities have not applied this duty"—thirty-five per cent. on imported lithographs—"up to the present day in the spirit of protection. In making this assertion we have especially in view importation of fine cigar labels. There are at present in this city"—New York—"three houses making a speciality of that business, and they import several hundred thousand dollars' worth of labels which, under a just and correct application of our tariff laws, should be printed right here in the United States."

Whatever our contemporary may write on the advantages of protection, we should have thought that a country like America was too far advanced and too independent to fear the competition of any nation in a free market. Unlike Great Britain, the United States need never send abroad for food stuffs, and as food is the staple of existence, their existence is secured better than in Great Britain. With even a security against direct want caused by dearth or war, surely the Americans could well afford to open their markets to this country, seeing how largely we import their raw material and the necessities of existence.

However, we must accept the position with good grace and the assurance of our American cousins that we work cheaper than in the States. To work cheaply is one point ; to work well is another. It is often said we must go away from home if we want to know anything about ourselves. Everyone is only too familiar with this phase of human nature, that gossips and exaggerators are always on the alert to ply their busy tongues on other people's business. But in this particular case of the world's lithography, those to whom we go to hear our own business discussed are men in the same craft who feel a little hurt at the apparently invidious comparison of American and European productions. To gather an honest expression of opinion on the subject, we again quote from an American paper, *The Lithographers' Journal,* in which the subject of lithography at the World's Fair is under review. Thus runs the sentence which furnishes sufficient food for inference :—"Every lithographer knows the possibilities of his art, and should feel an individual pride in making a display which shall be amply representative, which shall remove the somewhat too prevalent misconception that Europe can excel us in the artistic quality of her litho work, and one which shall shew the highest range of production within the vast scope of the different processes."

This quotation is sufficient to shew that even now European work is held before the American as a standard of quality, and the previous quotation proves that Europeans work more cheaply. This gives rise to the very natural question, "Why do they work more cheaply?" But at that point we defer, and look rather to another feature of the case.

Anyone who knows the heterogeneous mass of printers and artists in America, knows that it is composed of the first rank—if not the best men—of the craft picked from all the countries where lithography is practised. Men who have found that their native countries are too well stocked. Men who have found that there are always plenty of others who will offer their services at a mere subsistence. Men who have found that personal jealousies prevent them rising amongst their own people, and who have found that their services are not appreciated at their proper value. These are the men who go where talent is justly rewarded, and assist in building up the greatest commercial nation of the world. We are only speaking that which is only too well known. Twelve to fifteen years ago, the American steamers could be seen packed with the ablest men of the country. Since then, month by month witnesses the departure of more, and so long as men are kept on mere subsistence wages, with the workhouse for their old age, so long will this drain continue, until the wealth of Great Britain—the labouring population—has drifted to other shores.

One more consideration should be brought prominently before the whole craft. In giving the quotation in reference to the World's Fair, it would be noticed how the lithographers of the States are being urged to make a fine display, to eclipse the European productions. Well, if we have any faith in the quality of our work, we must at once concentrate our efforts in the same direction to make a fine display of British lithography. One point the American lithographers have gained, and that is that the printing craft should have a special commissioner and that lithographic prints should have space allotted in the building for the liberal arts, whilst the machines will be confined to the machinery building.

The opportunity is open, the Americans have done their best to secure a proper recognition of the craft, and it rests with those interested to shew the world that British lithography can still hold its own.

Mezzotints.

OCCASIONALLY repeating itself, fashion simulates history. The most popular style of engraving toward the latter part of the last century was mezzotinto. To-day there is apparent in Europe a disposition to revive the craze for this feature of illustrative art, which dates from 1642. In that year, Lieutenant-Colonel (afterwards Count) von Siegen published a print of the distinct character of mezzotinto. It was a portrait of Princess Amelia Elizabeth of Hesse, and was undoubtedly the earliest mezzotint engraving. Well-preserved copies of this portrait are extant, but they command high prices on account of their great rarity. At a sale in London, a few weeks ago, of a valuable collection made by Walter Tiffin, author of "Gossip About Portraits," a first state of this first-known mezzotint sold for £21. In his "Lexiques des Termes d'Art," Jules Adaline says that mezzotint has been practised in England with the best results, and that almost every engraver who has attained renown in this branch of art has been an Englishman.

About 1650, Prince Rupert acquired the art from Count von Siegen, who died ten years later. Many writers have erroneously attributed the origin of mezzotint to Prince Rupert. He greatly improved the process, but the laurel of discovery rests with Von Siegen. Wallerant Valliant, born at Lisle in 1623, was employed by Prince Rupert to lay his grounds on the copperplates. It was Valliant who taught the art to Baron von Fürstenberg, and either he or Prince Rupert introduced it into England. Sir Christopher Wren, architect of St. Paul's Cathedral, was the first Londoner to practise mezzotinto.

There remains a single example of his work in this line. It was done in 1660, and represents the heads of two negroes. Since Wren's time there have been in Great Britain many facile mezzotint engravers; among them White, who made a copy of Sir Godfrey Kneller's portrait of Monnoyer, the flower painter; and Valentine Green, an artist much esteemed by Sir Joshua Reynolds; Romney, and West. It is recorded that Green produced upwards of 400 mezzotints within thirty-eight years.

An Irish engraver named Edward Fisher also employed the mezzotinto process in reproducing portraiture by Reynolds. Other capable workers with the "scraper" and "rocker" in England have been Isaac Beckett, Francis Howard, Jones, Watson, McArdell, and Samuel Cousins Ward. In the United States this special art has made celebrity for the names of John and Samuel Sartain, McNair, Graham, and Thomas B. Welch. At the Tiffin sale $170 was the price paid for Baron von Füstenberg's mezzotint portrait of the Archduke Leopold Wilhelm of Austria; John Watson's print of Titian was bought for $100, and Beckett's copy of Charles I., after Vandyck, was regarded as a prize at $60.

The process of mezzotinto may be described as the reverse of line engraving and etching. In both of these the copperplate is polished, whereas in mezzotinto there must be a roughened surface. The preliminary operation of laying the ground is performed with a rocker or cradle, which instrument closely resembles a cheese cutter in its shape. The edge is deeply serrated or notched. By rocking it gradually to and fro it gradually traverses or is driven across the plate, leaving behind it a path of indentations.

Thus a series of parallel ways is made, while at a certain angle other indented paths cross those previously made, until a sufficiently close and velvety texture is obtained in these grooves. If after this is done an impression is taken, the result on plate paper is a surface of the richest black. A scraper and burnisher are therefore next brought into play, the engraver working from dark to light by removing the grain with the first instrument and repolishing his plate —if for a pure white ground—with the second.

In mezzotinto the engraver thinks only of the masses relieved from each other by light and shade. When finished, the positives of his work resemble india ink wash drawings. He has nothing to do with linear effects. The advantages of his art, if not manifold, are at least varied. It does not require the labour entailed by line engraving, in which the copper or steel has to be gouged or plowed with a burin. By its range of tone mezzotinto is admirably adapted to representing the different textures in a portrait, the planes of a landscape or cloud and marine blendings.

BLUE PRINTS.—A new variety of blue prints is being brought out at Boston, the distinctive feature of which is a blue outline on a white ground. This is the reverse of the ordinary blue print, which has a white figure on a blue ground. One of the recommendations of this style of work is that corrections can be very easily made; though this is not desirable for all kinds of blue prints. There is also the advantage that the background can be filled in with any colour desired. The new style prints, it is claimed, can be made in one-tenth the time required for the old style.

· CHUMS ·

From a Photograph by John Burton & Sons, Haymarket, Leicester.

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The "British Lithographer" Examination Papers.

RESULT OF SECOND EXAMINATION PAPER, SET FEBRUARY 1ST, 1892.

ELEMENTARY.

No.	Names of Candidates.	No. of Questions Worked.	Full Marks obtained for Answers to Nos.	No. of Marks given for each respective Answer.								Total.	Possible Total.
				1	2	3	4	5	6	7	8		
1	E. A. Coups, Manchester - -	ALL	3, 5, 6, 8	14	19	25	18	25	25	14	25	165 97·05%	170
2	H. W. Ashman, Derby - -	ALL	5, 8	13	18	22	18	25	23	14	25	158 92·94%	170
3	A. Simpkin, Birmingham - -	ALL	1, 3, 6, 7	15	18	25	15	24	25	15	20	157 92·35%	170
4	C. E. Cooke, Loughborough -	ALL	6	13	19	20	18	20	25	13	22	150 88·23%	170
5	F. H. Lucas, Derby - - -	ALL	1, 6, 7, 8	15	14	15	14	18	25	15	25	141 82·94%	170
6	G. H. Wheelhouse, Burslem -	ALL	6, 8	—	16	20	18	23	25	12	25	139 81·76%	170
7	W. S. Freer, Derby - - -	ALL	8	12	16	22	18	15	20	10	25	138 81·17%	170
8	W. R. Streeter, East Croydon	SEVEN	4, 5, 8	6	15	20	20	25	18	—	25	129 83·22%	155
9	G. D. Cornford, London - -	ALL	—	8	14	18	10	18	24	12	12	116 68·23%	170
10	T. Livingstone, Derby - - -	ALL	—	8	12	14	18	15	15	10	22	114 67·05%	170
11	T. Shaw, Birmingham - - -	ALL	—	—	10	15	6	10	21	—	18	80 47·05%	170
12	- - - - - - - - - - - - -	ALL	—	—	—	—	—	—	—	—	—	50 29·41%	170

ADVANCED.

No.	Names of Candidates.	No. of Questions Worked.	Full Marks obtained for Answers to Nos.	1	2	3	4	5	6	7	8	Total.	Possible Total.
1	R. Snowdon, Accrington - -	ALL	2, 3, 8	24	20	10	13	24	14	26	20	151 94·37	160
2	H. Hendrie, Leith - - - -	ALL	2, 4, 6, 7	20	20	10	15	20	15	30	14	144 90·0%	160
3	C. Ridgard, Derby - - - -	ALL	1, 2, 4, 5	25	20	9	15	25	14	22	10	140 87·5%	160
4	W. H. Armitage, Manchester	ALL	1, 2, 3, 5	25	20	10	13	25	14	15	12	134 83·75%	160
5	W. Clarke, Derby - - - -	ALL	—	20	18	9	12	12	13	25	10	119 74·37%	160
6	T. B. Widdowson, Leicester -	ALL	—	20	18	9	10	23	12	18	8	118 73·75%	160
7	E. W. Hearn, London - - -	ALL	—	15	18	6	14	15	10	10	8	96 60·0%	160
8	F. Thornton, Leeds - - - -	SEVEN	—	15	19	3	10	19	11	—	2	79 60·76%	130

REMARKS.

Elementary.—(1) Very good; but a trifle too full of matter not bearing on the questions. (2) Very good; showing a fair understanding of the principles, but marked by some curious statements not absolutely accurate. (3) Very good; to the point and sufficiently exhaustive. (4) Good; fairly accurate, but short of details. (5) Good, but wanting in many instructive details. (8) Good; rather too cut and dried. (10) Good, but singularly short and wanting in any contingent matter. (12) All these answers are almost *verbatim* copies from books, and worth an aggregate of 50 marks.

Advanced.—(1) The answers to questions 2, 3, and 8 are excellent. The sketches to answer No. 7 are very good. (2) The answers to questions 2, 3, 4, and 7 are excellent. It appears that one sheet of the answer to No. 8 is missing. The sketches to answer No. 7 are first-rate explanations, and are good drawings. (3) The answers to questions 1 and 5 are excellent. The answer to No. 8 deals only with machine register. (4) The answers to questions 1, 3, and 5 are excellent, and the sketch to answer No. 7, although not what is required, is a first-rate drawing. (5) The answer to No. 8 deals only with machine register.

The "British Lithographer" Examination Papers.—No. 2.

Questions Worked Out.

Elementary Grade.

By E. A. Coups, Manchester.

Question I.—What is the theory of lithography? (15)

Answer: The theory of lithography is based upon a chemical principle, the whole principle depending upon the antagonistic qualities of grease and water. The lithographic stone, which is a carbonate of lime combined with a small quantity of carbonate of magnesium, is very sensitive to grease, which is put upon the stone to form the work required. There are various ways of putting the grease to the stone, viz: from copperplate transfers, autographs, drawings upon stone and paper, chalk drawings, writings, etc. The grease by itself is too soft to put upon the stone, it would run or spread, therefore it must be hardened with the following:—Crayons for chalk work contain a large percentage of soap and wax, which is hardened with shellac. Plate transfer ink is hardened with pitch and shellac; and litho writing ink with shellac.

The transfers, writings, or drawings, are upon transfer paper, which is an ordinary printing paper coated with a composition that will adhere to the stone. For writing paper it is coated very thinly with starch or gamboge. For plate transfers, equal parts of flour (seconds) and plaster of Paris. For chalk transfer paper it is coated thickly with a composition of two tablespoonfuls of dry stucco, one tablespoonful of flour, half-ounce of isinglass, and the whites of four eggs. The writings and drawings are either damped at the back or in the damp-book, and for plate transfers the stone is damped. This is to make them adhere to the stone. The transfers are laid on the stone and run through the press, they are then damped and run through again, in some cases three or four times, until the paper can be freed from the composition, the composition is then washed off, and the work remains. It is then gummed, and if it be a writing it is rubbed up with ink and turpentine.

When it has stood for a short time, and the stone is absolutely cold, it must be well rolled up, and if it has a smutty appearance, or is not clear or sharp, it must be dusted with French chalk or resin, and etched with a weak solution of nitric acid and a little gum, and all the dirt or specks cleared away; it is then gummed over and allowed to dry. When dry the gum must be washed off, and the work washed out with turpentine and olive oil, and when well rolled up it is ready for printing. The stone must be kept damp during printing, to prevent the ink from adhering elsewhere than on the work. When the stone is damped and rolled up with the ink roller, the paper is laid on and pulled through the press, and the print obtained.

In the case of chalk drawings, the stone, after it has been polished, is grained. The reason for polishing first is to be sure that the old work is worn out of the stone, as old work comes up more readily on grained stones than on polished ones. The graining is done with fine sand and water. The reason for graining is to break up the face of the stone into minute parts so that the rollers will grip the stone and fill the work in better; the graining assists in preserving the work. (14)

[This answer is overloaded with a lot of matter appertaining to the practice rather than the theory.—Ed.]

Question II.—What is the action of water in lithography? What is the action of grease in lithography? (20)

Answer: Water is one of the principles of lithography. It is used for polishing stones, wet stone transfers, damping the stone when printing, damping transfers, and for the damp-book.

For polishing stones.—Without its use, the required fine grain could not be obtained on the litho stones, and the surface could not be got so smooth, or be cleared off equally well.

For transferring.—It is used for damping the stone for wet stone transfers; to damp the damp-book for writings, etc., to make them adhere to the stone; and to damp the backs of autograph transfers. It is also used to damp the transfers after they are on the stone, to free the paper from the composition, and then to wash off the composition and leave the work upon the face of the stone. During printing, the stone is damped so that other parts uncovered by work will not pick up the ink; the water not affecting the greasy ink.

It is also used for making liquid gum for use on stones; letting down the strength of acids; dissolving ink for writing or drawing on transfer paper or stone.

Grease is one of the principles of lithography, and forms a compound with lithographic stone. It is put to the stone in various ways. The grease itself being far too soft, has to be hardened to a certain extent to prevent running. In plate transfer ink the tallow and wax are hardened with pitch and shellac. In re-transfer ink for stone to stone work, an additional quantity of grease is added to ordinary printing ink.

The grease forms the work upon the stone; when the stone is damped the water is free from the work. There the ink must contain greasy compounds for the work to pick it up, and give the print required.

The washing out of the work is also done with greasy matter, such as turpentine and olive oil. (19)

Question III.—What is the action of gum in lithography? What is the action of acid in lithography? (25)

Answer: The action of gum in lithography is to fill the pores of the stone after the work is on, to

prevent the ink from catching elsewhere than on the work. It forms a compound with lithographic stone.

Gum goes sour by loss of potassium and calcium, when this takes place it etches the work. If pure chalk is added during the preparation, or a little carbolic acid, 1 part to 820, it will prevent it going sour.

In gumming up a stone that has to be laid by for any length of time, it should be covered with a paper which is also coated with gum arabic. Otherwise the paper will absorb all the gum and leave the face of the stone bare. The paper should be pressed down firmly and all air bubbles removed. For gumming out, a little nitric acid is added to prevent it running or spreading.

Its action with acid, in case of etching chalk drawings after transferring, is to convert the crayon (which is used in drawing) into fatty acids, and to prevent the soap from spreading and filling up the grain when the stone is damped.

[*Instead of applying this sentence to gum, it should have gone in the acid series.*]

The acids used in lithography are those that leave insoluble crystals after their action, such as nitric, citric, and oxalic acids.

If acids are used that leave soluble crystals after their action, when the stone is damped these crystals dissolve and are removed, and thus the work is worn off the stone; these acids are hydrochloric and acetic.

Nitric acid [HNO_3] completely dissolves lithographic stone, it destroys any vegetable matter, such as gum, lamp black, linseed oil, etc. It leaves a sediment insoluble in water, which must be washed off after its use. HNO_3 on stone results in a formation of calcium oxide [CaO] which is unslacked lime. After the use of this acid the stone is on a small scale grained; the work must be protected with French chalk or resin during the etching. It clears away the smuttiness that appears in some work, and gives it a clear and sharp appearance. It is used with clear gum to etch chalk drawings, and to convert the crayon which is used in drawing into fatty acids, making it insoluble in water. It is used with water (very weak) for autograph transfers, to make them adhere to the stone.

Citric acid [$C_6H_8O_7$] is obtained from citrons, oranges, and lemons; it forms with stone the citrate of lime which is insoluble. It is used to clear out the gum from stones which are to receive new work. It bites clear, and its strength should be slightly weaker than lemon juice. This acid is preferred before acetic on account of the insoluble crystals after its action.

Oxalic acid [$C_2H_2O_4$] destroys the stone and forms the insoluble oxalate of lime. It is used principally to clear the edges of stones in machines, but it would kill the work on the stone if used otherwise.

Carbolic acid [C_6H_5OH] affects the stone but little. Among its uses are to add to paste, and to the water used for the damp-book to prevent mouldiness, and to gum to prevent it turning sour. It is very useful to add to turpentine, as it increases the penetrating vigour, and more readily dissolves the old ink upon the work.

Sulphuric acid [H_2SO_4], or oil of vitriol, is a strong acid. After its action upon litho stone, it leaves a heavy, insoluble sediment behind. This acid requires so much diluting with water that it is difficult to get it to its proper strength for stone use. Therefore, nitric acid is the better of the two.

Hydrochloric acid [HCl], known as muriatic acid or spirits of salts, readily decomposes litho stone and forms the chloride of lime. The presence of chlorine in this acid renders it unfit for use on stone. It leaves soluble crystals after its use, which may be removed by washing with hot or cold water, and this ruins the work upon the stone.

Acetic acid [$C_2H_4O_2$], known as vinegar. Its action upon stone is slow, but ultimately results in destroying it, and leaves a sediment of soluble crystals behind, which ruins the work upon the stone. It is sometimes called glacial acetic acid. It boils at a temperature of 118°C. and sets like ice at 17°C. The fault of this acid is the soluble crystals that remain after its use. (25)

QUESTION IV.—What is the nature of a lithographic stone? What is the colour of the best stones? Why are pale-blue stones preferred for chalk work? (20)

ANSWER: Lithographic stone is a sedimentary rock, found at the bottom of a tranquil sea or salt-water lake in Bavaria, Solenhofen in Germany, Ain in France, and Liguria in Italy. The composition of lithographic stone is alumina, carbonate of lime, silica, magnesia, and iron.

Of the same chemical nature of litho stone are coral, marble, mountain limestone, shells, and chalk. Litho stone does not dissolve in cold water, but it may be dissolved by the use of acids.

The colour of the best stones for general use is yellow, because the work can be seen upon them better than upon the darker ones, but they are of a softer nature than grey stones.

Pale-blue stones are preferred for chalk work, because in most cases chalk drawings are printed from grained stones, and the pale-blue stones being harder than the yellow ones, a finer and sharper grain can be obtained. They are also preferred because these drawings require more etching than ordinary work, and the stones being harder, will stand a stronger etch than yellow ones, with less decomposition. (18)

QUESTION V.—If you etch a stone too strongly or too weakly, what will be the result in each case? (25)

ANSWER: If a stone is etched too strongly, the work is spoiled in most cases. The acid has either remained on the stone too long or it has been too strong, or the work has not been thoroughly rolled up and protected with French chalk or resin, etc. In the case of over-etching, the best remedy is to stand it before a fire and allow it to get thoroughly warm and then go cold. If it is no better then, and the finer parts of the work will not roll up, it has been completely spoiled by the action of the acid.

If a stone is etched too weakly, there is a better chance of getting it right than in the case of over-etching. The work will not appear sharp or clear, and if it is a chalk drawing, the ink is liable to run or spread with the damp, and the work will become solid. A sharp look-out must be kept for this, and if it is not etched sufficiently, the work must be cleared and well rolled up, and etched again. (23)

QUESTION VI.—What are the component parts of lithographic ink? What is the action of soap in lithographic ink? (25)

ANSWER: The component parts of lithographic ink are:—In black printing, calcined black well ground in varnish, with a little dark blue added, to give it a good tone and improve its drying qualities. For chalk printing ink, Paris black replaces lamp black.

The ink is ground upon a slab with a muller until the varnish will contain no more of the pigment, as it grinds better through being stiffer. It can then be let down with varnish, boiled oil, or other material, according to the work it is intended for and the strength of the ink required.

The component parts of lithographic writing ink, for writing or drawing on stone, are:—4-oz. tallow, 4-oz. wax, 4-oz. soap, 4-oz. shellac, and black to colour. For writing or drawing on paper:—4-oz. tallow, 5-oz. wax, 4-oz. soap, 3-oz. shellac, and Paris black to colour. Order of making:—Melt tallow and wax, then gradually add the soap (this equals 12-oz.); heat until the fumes will ignite, and then burn down to 8-oz.; then add the shellac slowly, and when it is melted add the black.

To test for blackness, put the ink in a saucer and add a few drops of distilled water; should the ink remain black for half an hour, the black is good. If it is not black enough, allow the fumes to pass off.

Re-transfer ink for stone to stone:—2-oz. litho writing ink, 2-oz. printing ink, and 2-oz. thin varnish. First melt writing ink, then mix printing ink and varnish together and add to the writing ink, and boil and mix well.

Plate transfer ink:—first, 4-oz. tallow, 4-oz. wax, 4-oz. soap, 4-oz. shellac, 4-oz. pitch, 4-oz. stiff printing ink; second, 8-oz. tallow, 8-oz. wax, 4-oz. soap, 4-oz. shellac, 1-oz. lamp black, 8-oz. Venice turps, 8-oz. Burgundy pitch. Making:—first melt tallow, wax and soap, mix well, and heat until they will set on fire, and burn for about fifteen minutes; then add the other ingredients, and when they are melted, if the ink is not hard enough, set it on the fire and heat again until the necessary degree of hardness is arrived at.

Litho artists' crayons:—first, 4-oz. soap, 4-oz. wax, 4-oz. spermaceti, and 2-oz. black; second, 6-oz. soap, 8-oz. wax, 4-oz. shellac, 4-oz. tallow, and 4-oz. black.

The action of soap in lithographic ink is first:—In litho writing ink, being soluble in water it is liable to run, and the ink on the work will dissolve when washed with a sponge and water, this is on account of the soap in the ink. This is in cases where the work is solid, or heavy lines, or the ink being used too thick. In this case it is best to etch the work with a very weak nitric acid and gum solution.

In the case of litho artists' crayons, the soap is used in large quantities, and when the stone is damped the soap which is combined with the crayon dissolves, and it would completely thicken and destroy the drawing if it was not etched with nitric acid and gum solution. The object of etching in these cases is to convert the soap, etc., into fatty acids, and then they will not dissolve in cold water.

If soap be used in re-transfer ink for stone to stone work, it is difficult to work on account of a scum forming, and a thoroughly clear, sound impression cannot be obtained.

In plate transfer ink the soap will not work with water, because the pitch holds it firm, and it requires to be hot before it will soften, without the aid of turpentine. (25)

[The question is certainly indefinite as to *which* lithographic ink, and the answer is admissible.—ED.]

QUESTION VII.—What is lithographic printing varnish? (15)

ANSWER: Lithographic printing varnish is the vehicle in which pigments are ground to form printers' ink. It is made from linseed oil, which contains:—

Fat and oil … … … … … …	32%
Albuminous matters … … … …	30%
Ash … … … … … … … …	4%
Water … … … … … … …	34%

The oil is put into a vessel large enough to hold double the quantity. It is then placed over a fire and heated until white fumes arise. These fumes are set on fire, and they must be watched so that the flames do not become unmanageable. If the flames go down, they may be increased by stirring the oil; if they come too high, the lid must be put on the vessel to extinguish them, and it must be kept on long enough to allow the oil to cool down a little. If the flames were not extinguished they would flare up as much as before when they came in contact with the air. The oil is burnt in this way until it becomes one-sixth less than its original weight. This forms the basis of varnish. It must then be heated until the fumes pass off, and the grease must be skimmed off at least three times. A thick piece of bread is put in to soak up the grease, and it is moved about until it is browned, it has then soaked up as much grease as it will hold; in some cases, three pieces of bread are used. It is then allowed to burn a little more to revive the flames if they have become dull; this gives us thin varnish. It is burnt again for medium, strong, or extra strong. (14)

[This mode of manufacture is only on a small scale.—ED.]

QUESTION VIII.—What is transfer writing paper? Why is it coated? With what is it coated? (25)

ANSWER: Transfer writing paper is an ordinary printing paper covered with a coating. It is the paper on which litho artists make their writings. It is much better to write upon this paper than it is to write backwards on the stone, and better work can be obtained by this method. [Query.—ED.] It is a paper that is more or less porous to allow damp to pass through, and it is coated with a material that will leave a nice smooth surface to write upon. If the coating is rough, the pen will not work properly upon it, and the fine lines will not transfer. The coating must be sufficiently hard so that it will not allow the ink to soak into it.

Transfer writing paper is coated to make it adhere to the stone, and to allow more than one run through the press, and for the work to be written upon the coating, and not on the face of the paper. In transferring it adheres to the stone; the paper is damped

and run through under reasonably heavy pressure several times; when it is sufficiently damped and run through enough, the paper is covered with water and allowed to soak through until it will peel off. The coating is then left on the stone; this is washed off, and the work remains as if it had been written or drawn upon the stone.

Transfer writing paper is covered with a thin coating of starch and gamboge mixed together, or each may be used separately; but the paper must be coated very thinly in either case, just sufficiently to fill the pores of the paper and to keep the ink upon the surface, and at the same time to adhere to the stone. (20)

Advanced Grade.

By R. Snowdon, Accrington.

Question I.—Why are oils burnt instead of used pure? What would be the result if you worked with pure oil? (25)

Answer: The object of burning oils is to rid them of the greater portion of their greasy or fatty matter, and to render them of a thick viscid or syrupy consistency, an essential feature in varnish for use by the lithographer. It also gives to them drying properties, by enabling them to absorb oxygen to a greater degree. After burning, oils are still of a greasy nature, on account of the partial condensation of some portion of volatised or unburnt oily matter, as to enable them to feed the work with a slight portion of grease, and by their thickness or viscidity of different degrees, the pigments ground with them, forming the printers' ink, are bound together, which enables them to be readily distributed by the rollers from the ink slab to the stone and from thence to the paper, which would not be the case if a limpid oil were used. Some pigments, on account of their heavy nature, require a stronger varnish than others to enable them to print properly, but for all classes of work where clean and sharp impressions are required burnt oil or varnish of some degree of consistency must be used. To work with pure oil for any length of time would be almost an impossibility; in the first place it is too limpid, and would not have sufficient tenacity to bind together the pigment incorporated with it, if at all heavy, and would leave it on the slab, rollers, or work; and even after printing, the oil drying into the paper would leave the colour, bronze, or dust loose on the surface, thus allowing it to be easily rubbed off. The impressions would smash under pressure, lines in close proximity and stipple would run together, and if the stone was not kept sufficiently damped, a scum would form on the surface difficult to remove, and by adding to the greasy nature of the work already on the stone would soon spoil the job. (25)

Question II.—What are the component parts of lithographic chalk? What is the use of shellac in lithographic chalk? (20)

Answer: In the composition of lithographic chalk a certain diversity exists in the proportions and number of the ingredients, each maker having his own particular mode of procedure and composition. A good useful chalk may be made from equal parts of wax and dried yellow soap and one-half a part finely-sifted Paris black, and may by judicious burning be made to yield chalks of various degrees of hardness. The various recipes given by Senefelder will yield a great variety of chalks, by burning them more or less, and also in working by the variety of grain they produce, each having its own peculiarity in working, which will be found useful by the artist. In all compositions a large quantity of soap is used, for if it be too little they do not work freely, and are more liable to be affected by variations of temperature. The following are good compositions, and also show how the ingredients vary:—

No.	Soap.	Wax.	Paris Black.	Tallow.	Spermaceti.	Shellac.
1	4	8	2	—	—	—
2	4	4	2	—	4	—
3	5	8	5	—	—	4
4	5	8	3	2	—	4

Shellac is not a necessary ingredient in the composition of lithographic chalks, and being a hard brittle resinous substance, it will have a tendency to make them hard and brittle, and not allow them to work so freely, and where used spermaceti should be omitted and tallow added to counteract in some degree the hardness caused by the addition of the shellac. In No. 1 or copal chalks it may be advantageously used; in the first instance it would enable a firmer point being kept, and for copal chalks used on grained paper would help to keep the drawing from spreading during transferring, by giving a drying and hardening tendency to the other ingredients, and also enable the fine parts of a drawing to better withstand the action of the acid used in etching. (20)

Question III.—What are the component parts of good lithographic black ink? (10)

Answer: The composition of a good lithographic black ink will slightly vary, as each ink maker has his own particular recipes and sources from which he obtains or manufactures the pigments used in its composition; but the chief ingredient is carbon, and the principal sources from which carbon can be obtained may be divided into three classes: (1) those made as soot; (2) those produced by charring; and (3) those mineral substances which are naturally black. Carbon can be produced in a variety of ways. All animal and vegetable substances have a basis of carbon, and when they are submitted to the action of a great heat in partially closed vessels—take for instance a gas retort—imperfect combustion takes place, and the gaseous matters are volatised and carbon remains. Or when only substances are burnt, without a full supply of air, a substance is formed which is carbon. By this imperfect combustion of animal and vegetable substances, such as fats, oils, hydrocarbons, turpentine, naptha, benzole, and resinous substances, coal tar, etc., such blacks as lamp, gas, essence and spirit blacks are formed as soot. In all cases the substance must be set on fire, and the soot collected by suitable means according to the mode

of manufacture adopted, the principle of which may be illustrated by holding a piece of tin plate over the naked light of a candle, or a lamp burning oil or spirits, and collecting the soot. These blacks are often of a greasy nature, which can be removed by heating in closed vessels until the oily matter is burnt away; they are then called calcined blacks, and from these the cheaper grades of lithographic blacks are compounded. Ivory, bone, Paris, and Frankfort blacks are charred animal and vegetable substances, and vary in quality and shade of colour according to the care exercised in their manufacture. The more animal matter there is used the greater will be the tendency to a brown shade, the colour produced from vegetable materials inclining to blue. This fact being recognised by the ink makers, they always add an intense blue, such as Chinese or Prussian, to their black inks, varying according to the shade and quality of the black used in its composition. From these blacks the better qualities of inks used for fine press and chalk work are manufactured. A good 2/6 machine ink may be compounded as follows:—

Dry calcined lamp black	17½ lbs.
Chinese or Prussian blue	2½ ,,
Mid. litho varnish	30 ,,

and a fine 10/- black for press or chalk work:—

Best dry Paris black	12½ lbs.
Chinese blue	2 ,,
Thin litho varnish	7½ ,,
Mid. do.	7½ ,,

(10)

Question IV.—What is the difference between writing transfer paper and plate transfer paper? (15)

Answer: The difference between writing transfer paper and plate transfer paper is that the former is a thin paper of fine texture coated with various kinds of size and given a highly-glazed surface by rolling, whilst plate transfer paper is a thick unsized paper coated with a composition of Paris plaster and flour paste, and has a matt or dead surface. Writing transfer paper, as used by law writers, architects, etc., is generally a half-sized foolscap paper coated with a warm mixture of isinglass or gelatine size and flake white, coloured sometimes with a little gamboge, the flake white being added to give a slight tooth to the pen; and is not so highly polished, merely pressing between glazed boards being sufficient. That used by the professional transfer writer for fine work is a thin paper, rendered necessary by the writer requiring a yielding surface to work upon (but for large drawings a stouter, well-sized paper is used), coated generally with a size made from parchment cuttings, gelatine, or Russian glue; whichever kind of size is used it should form, when cold, a stiff, firm jelly, and be applied warm to the paper, with the addition of a little flake white coloured with gamboge or cochineal; the paper should receive two coats, and be afterwards highly glazed by rolling, rendered necessary by the delicate character of the pens used. This paper is generally used on warm stones, and should only be moderately damped for transferring. Plate transfer paper is a 15 or 20-lbs. demy printing paper, coated with a mixture of equal parts by weight of the finest Paris plaster and seconds flour, and by some makers a little glue is added, but where seconds flour is used glue is not necessary; the plaster is killed, or its setting properties destroyed, by being stirred in sufficient water for thirty minutes; the flour made into a stiffish paste, the two mixtures incorporated together, strained, and applied evenly whilst warm to the paper to the thickness of thin card. This paper may be used on cold or slightly warm stones, allowing more damping than writing transfer paper, and when on the stone and damped through the back, the composition swells up on each side of the lines and prevents the work from spreading. In addition to being used for pulling transfers from plate, it may also be used for making grained or stippled paper, if a little size be added and coated on drawing or similar stout paper. (14)

[There seems to be a misunderstanding in this answer. It is laid down as the first point of difference, that transfer paper is a thin paper and plate paper a thick unsized paper. In actual practice the transfer paper of the litho writer or artist can be, and is, of any thickness, and the plate paper may be the same. Some of the finest plate transfers have been taken on this French transparent tracing transfer paper.—Ed.]

Question V.—What are the advantages and disadvantages of the duct for the ink on lithographic printing machines? How have some of the disadvantages been overcome by mechanical improvements? (25)

Answer: The ink duct on lithographic machines built a few years ago was not looked upon as a labour-saving appliance with the same amount of favour as at the present time, and even now machinists differ as to its utility; but by the improvements introduced, and a thorough knowledge of its mechanism by the machine minder, an ink duct for a large majority of the work executed by machine is a decided advantage, viz., where long runs are required, where large solids occur in the work which require an even and plentiful supply of colour to secure an even quality of the impressions in the printing of tints, and by allowing the machinist to devote more time to the work and damping. Of its disadvantages may be mentioned the following: a waste of colour; for after being in the box for some time the oxidising influence of the air causes it to become pasty, and a certain amount always being required to feed the ductor, on the printing being finished, the colour has probably to be thrown away, its keeping qualities being destroyed by the addition of driers. Its darkening action on some colours, which by reason of their chemical nature should not come into contact with iron, where the runs are short, the printing light, and a change of colour necessitated each time, the loss of time and materials used each time in cleaning up would be to its disadvantage; and owing to faulty construction of some of its mechanism, the machine minder not being able to regulate the supply of colour suitably to the work in hand. Some of the mechanical improvements introduced lately are: a continuous feed motion, and the effectiveness of ratchet motion (used on the older machines) being increased by the addition of an adjusting catch, which allows the ductor or ink cylinder to be moved from one to six teeth each traverse of the machine; by an increase in the number of set and drawback screws, which regulate the knife, thus ensuring a more delicate adjustment

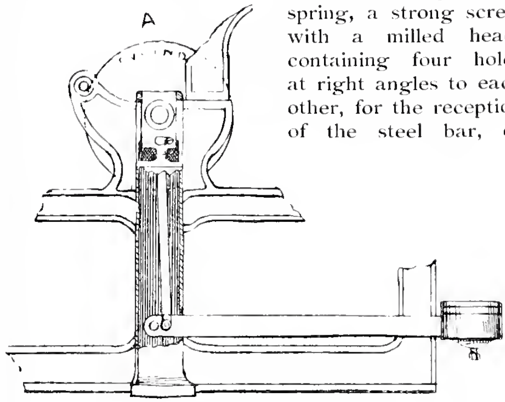
and supply of colour; by the addition of an adjustable connecting rod for working the vibrator, which causes it to remain in contact with the ductor during the whole of the time allowed by the traverse of the machine, thus ensuring it taking off the full supply of colour allowed by the revolution of the ductor; and by a continuous feed motion worked by an endless chain from the main driving shaft, furnished with an instantaneous check action, this motion being especially useful where large supplies of colour are needed. Some machines are also fitted with a lid to the ink trough, which helps to keep the colour clean, and preserves it from the oxidising influence of the air. (20)

QUESTION VI.—How is Naples yellow mixed and used in printing? (15)

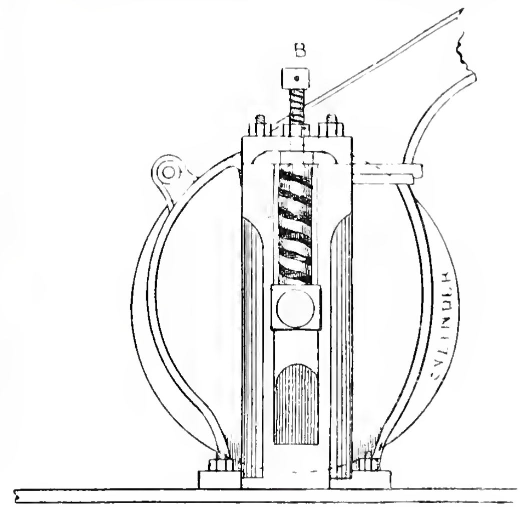
ANSWER: Naples yellow, as its name indicates, was originally prepared at Naples, probably from some mineral or matter of volcanic origin, but it is now manufactured artificially from oxide of lead and antimony, and varies in depth of colour; generally it is a light-warm yellow of a pleasing tone. It is a good drier, and stands the action of light well, though liable to turn black under the action of impure air, in addition to a tendency to turn green or approaching black when brought into contact with iron or steel. It should not be used by the colour printer except under circumstances of an imperative nature, but when used it should be introduced during the earlier printings, on account of its opacity, except when used for covering other colours, for which purpose it may be used alone. It must not be used in forming mixtures with colours containing iron, such as the ochres, Prussian and Antwerp blues, and similar pigments. It should be ground on a marble slab with a muller of the same material; an ink mill, even with granite or porphyry rollers, being unsuitable on account of the trough and blade for taking off the colour being of steel and iron; it must not be used with the ink duct; and the ink slab of the machine must also be of marble; and in mixing, a bone or horn knife used in place of the steel palette knife, a good substitute being a bone paper knife. (13)

QUESTION VII.—How is the pressure applied in lithographic machines? Give a sketch of the mechanism. (30)

ANSWER: There are two methods now in use for applying pressure to the cylinders of lithographic printing machines: the first as sketch A, by a simple lever and weights, the principle as used on some of the first machines built; and secondly as sketch B, by means of powerful spiral steel springs fixed between and bearing against the cap of the headstocks of the cylinder and its brasses or bearings. The principle of the lever and weight consists of a solid metal bearing bored out to receive the cylinder shaft, and planed to work true between the headstock, and on the inside next the cylinder is left a flange to prevent a sidereal movement of the cylinder; to the under part of this bearing is fixed, by a pin, a rod called the pressure bar; and connected to the lever also by a pin, a short distance from its end, and on the end of the lever, are placed its weights in three sections to allow of different degrees of pressure being obtained. The principle of springs is the one mostly in use, and slightly varies in the construction of the various parts with different makers, though the principle is the same—that of a spiral steel spring, or springs, bearing directly above, and sometimes connected below the cylinder; and to apply more pressure or make up for the relaxing of the spring, a strong screw with a milled head, containing four holes at right angles to each other, for the reception of the steel bar, or



"tommy," used to work the screw to compress or relax the spring. This is again held in position by a lock-nut, to prevent the pressure from working off by the vibration of the machine; and where the springs are fixed below the cylinder, as is the case with some machines, the cylinder brasses or bearings are gripped by an iron bar and connected to the springs, which



are fastened to the bar girders on the inside of the machine. With this system of springs, when the stone comes under the pressure of the cylinder the springs are forced to communicate a somewhat harsh and rigid pressure, and by this harshness does not allow to the clothing of the cylinder that elasticity needful for the best quality of impression; but with the counterpoise system, a more gentle and even pressure is exerted, and being very elastic, contributes largely to obtaining good impressions. Each system has its

advocates, but one of the best and latest authorities on lithography is inclined in favour of the counter-poise, or simple lever and weight. (26)

Question VIII.—Describe the method of "lay" register, and shew its advantages or otherwise over other methods of register. (20)

Answer: "Lay" register, as used for the hand or presses driven by power, is the quickest and most simple method of adjusting an already printed sheet to the stone in such a manner that the next colour to be printed shall fit or exactly coincide with the spaces left or intended for it by the artist, and all his care and skill will be lost if the printer fails to make the colours register, fit, or fall into their proper places. It is a matter of the greatest importance, and should receive careful attention by the colour printer. In all methods of register the key-stone should have applied to it in a suitable position appropriate marks to facilitate future operations. In "lay" register it is better, though not essential, that the size of paper be determined beforehand, and that the edges be cut clean. A sheet is now taken and placed in proper position on the key-stone, and a lay made corresponding to one end and two top corners of the sheet, the lines to be finely ruled in with litho ink. These lines must be printed on all the set-offs. On the stones where dark colours are used the lines may be drawn along with the other work, and allowed to print, as they will be sufficiently distinct for the printer to lay to, but on stones where light colours are used these lay marks must be more distinct than the colour printed will allow. The following method may be adopted: cover the lay marks left by the set-offs carefully with a coating of gum, and allow it to dry, then with a needle make moderately deep scratches exactly over the lines of the set-off, then go over these scratches with a pen and ordinary writing ink; when dry, on washing away the gum, a sharp black line will be left that should last all through the printing; or the scratches may be rubbed in with transfer ink, before clearing away the gum. Where large sheets are to be printed it is an advantage to have lay marks at the four corners, and have assistance in laying the sheet, and where a few proofs are required the following method may be adopted: on the key-stone, allowing a proper margin round the work, at the four corners place lay marks, thus, L ruled in with litho ink, and put down with the set-offs, and rule in when drawing each colour; allow these marks to print with the first colour; then, with a pair of scissors, cut close to the lines printed, forming four sharp corners, for the future adjustment of the sheets, during the printing of the other colours. The other methods of register, briefly stated, are: first, by needles; on the key-stone a small dot or cross must be placed near the centre of the shorter or longer edges of the sheet on opposite sides, print these marks on the set-offs and ink with litho ink, and then print with the first colour, with a needle prick holes through the dot or intersection of the lines; whichever is used, and in corresponding places on the set-offs on the stone, with a stout needle, drill two fine holes; two fine needles mounted in pieces of cane are now taken, and for printing in the second colour passed through the holes from the back of the sheet and adjusted to the corresponding holes drilled in the stone; a little variation can be given to the sheet, to correct errors of expansion, by inclining one or both needles in the required direction. By fixed points, for large sheets, a thin lathe of wood may have the requisite marks printed upon it, and two needles inserted at the proper points, and the printer have assistance in fixing the needles to the holes; but this method admits of no variation of the needles in opposite directions. By points in the stone two holes are drilled in the key-stone on opposite ends, and a plug of lead inserted in each, in the centre of which must be inserted a piece of pointed wire. In printing the set-offs, before lifting the sheet, puncture the holes by pressing the finger on the two pins, in putting down the set-offs, the lead plugs being inserted, and with the wire point place one hole on the point, pull through the press, and mark the second plug, through the hole from the back of the paper for the reception of the second pin; treat all the required stones the same, and in the first printing puncture the two holes through the paper before lifting the sheet; to correct any error in register, the pins may be forced in the required direction by a small punch used from the opposite side of the pin. Where sufficient margin can be allowed the following may be used: two pieces of brass, ¾-inch long, shaped like I and L, are to be tinned at the back and fastened to the key-stone by shellac; adjust the set-offs to the brass L fixed on the stone, placing the L piece next the tympan; on the colour stones, before lifting the sheet, mark where the I piece has to be placed, and attach to the stone. These last two methods require a good margin one way of the sheet, as the scraper must work between the lay points. The advantages of the first method of "lay" register described are: speed in laying the sheet; errors due to expansion or contraction easily remedied, by laying the sheet above or below in the required direction, no extra large margins being necessary; the absence of holes, which are apt to become large or torn by the stretching of paper where many printings have to be done. For the majority of work this method will be found all that is required, and in some houses is the only one adopted.

We have been favoured with a copy of Mr. Whistler's "Song in Stone," the illustration to the first number of the new monthly, the *Albemarle,* and is so called because it is a lithograph, the subject being the "Little Aple," and while not disposed to criticise too severely Mr. Whistler's undoubted ability in various arts, we would advise him not to sing any more in lithography, if we may be permitted to judge of the specimen before us.

Recently, the hundredth meeting of the Society of Etchers was celebrated by a dinner at the Art Club in Philadelphia. A brief discourse on etching was given by Peter Moran, who sketched its early history, retrogression during certain eras, and its modern revival and popularity. Thomas Donaldson was reminiscent of famous artists, and Mr. de Konsenko spoke at some length of impressionism.

A Study in Red

Printed with MANDER BROTHERS' Rubine Lake 0588 (reduced with their Tinting Ink for the Pink Tint), Burnt Sienna 0760, Chinese Blue (reduced).
By M'Caw, Stevenson & Orr, Ltd., Linenhall Works, Belfast

Big Work and its Difficulties.

THE introduction of large machines into the trade, first the quad crown and then the 60 × 40-in., has, in my opinion, been one of the greatest benefits conferred on it since the application of steam power to lithographic printing. There has never been a time when there have been more firms of lithographers than there are now, or more men employed in the trade (Yorkshire excepted), or when the men have had better wages than at present. Thanks to machines generally—and large machines particularly—good, speedy, and economical lithographic printing has been made possible, and in consequence new, important, growing, and profitable branches of trade have been opened up in the past few years. Picture posters, pictorial advertisements, and chromo supplements to magazines are instances, the trade in which, without the aid of machinery—big and otherwise—would have either been small and insignificant in character, or would never have come into existence at all, had we stuck to the old-fashioned hand-press method of printing, or even to demy machines. Reflect for a moment on the number of firms of lithographers at the present day and the number of men employed by them and compare them with the number ten years ago. The contrast will be still greater if the memory be carried back twenty or thirty years, and yet there were men then who used to freely express their opinion that "machines were going to be the ruination of the trade," or else that it would be impossible to do as good work on the machine as on the press. Time has, however, proved these fears groundless, for, as already remarked, there never has been a time when the trade was of greater or more growing importance than it is to-day, or when better work has been turned out on the machine, provided proper material is used. It may safely be predicted that, as time goes on, large printing machinery will come more and more into general use. Now, I am not prepared to say 60 × 40-in. machines, or larger sizes, will supplant smaller and, for some classes of work, more convenient machines, any more than the electric light will displace the use of gas. It would hardly pay to work a ream of headings two on, or a job of a thousand invoices or memos on a 60 × 40-in. machine; but for some classes of work, such as big poster work and jobs of very long numbers, a large machine is almost indispensable to enable a firm to execute a big order in the quickest possible manner and at the least possible cost. It pays, then, to have a big machine.

Nor have the benefits resulting from the introduction of big machines been all on one side, for whilst it has enabled firms to supply their customers with good printing at comparatively low rates, it has also enabled them to give their machine minders better remuneration, 42/- to 55/- being the figure usually paid for working a 60 × 40, according to the workman's ability. For this reason the post of machine minder on a large machine is much sought after, giving as it does better pay than that of the ordinary machine minders on the staff.

Seeing there is every probability of the extension of the use of big machines in the trade in the future, a short description of a large machine and its working will be of interest to those readers of the B.L. who have never seen one at work, whilst a few practical hints may at the same time help some machineman or other who may one day be called on to take charge of a machine of this class. Some readers may have an idea that only poster work and other kinds of big rough work are possible on large machines, but this is a mistake. Work of the highest class can be turned out as well on a 60 × 40 as on a quad-crown or smaller size litho machine. The productions of Messrs. Keep & Co., the eminent London firm of art printers, prove this. This firm have had several 64 × 44's at work for years, whilst their reproductions of the famous "Bubbles" picture are beyond criticism.

To take the machine itself, a 60 × 40 or 64 × 44 is not very different to a smaller size litho machine, only there is *more of it*. One of these machines alone would fill many a small printing office, as the following dimensions will shew: length, 21-ft. to 22-ft.; width, 11-ft. to 12-ft.; this gives a 60-ft. to 70-ft. run to get right round the machine. Perhaps some mathematical reader of the B.L. will calculate the miles of walking put in by the minder of one of these machines during an ordinary day's work! Height, 8-ft. to 9-ft.; weight, 15 to 20 tons; weight of stones used in printing, 8 to 12-cwt. each, requiring the services of three or four men to shift them in and out of the bed of the machine; weight of a ream of paper, 100-lbs. to 300-lbs.; speed, 500 to 900 runs per hour. These figures will give an idea of the heavy nature of the work in connection with a big machine.

A large machine has the following advantages from a printer's point of view. When the machine has a good foundation to rest on, there is an absence of vibration coupled with steadiness of working, owing to its immense weight; great rolling power and even distribution in consequence of size, weight, and number of inking and distributing rollers (any number up to a dozen are supplied with the machine); even and steady impression in printing—weight of cylinder alone between thirty cwt. and two tons, besides the additional power (when brought into play) of levers, springs, etc., enabling any amount of pressure to be put on up to seven or eight tons.

Only fancy working with seven tons of pressure on! The machine minder is advised when he does this to keep his eye on the stone. The chances are he will have *two* to take out in place of the one he put in. To ensure safe and steady working of a large machine, it should be situated on the ground floor, the frame resting on a solid bed of concrete, and let down eighteen inches or two feet below the level of the floor. All machine minders of average height and under will appreciate this practical reduction of the height of the machine, enabling him to see his work better as well as giving him more command over the machine generally; whilst a further advantage is gained as the stones are more readily shifted in and

out of the machine—a great consideration where short runs are the rule. With a lowered frame, the necessity of putting a platform or stage round the machine is got rid of. A stage is a great nuisance, taking up a deal of room—an important matter where space is limited; it is, however, very handy for shin-barking or for giving an occasional shock to the machine minder's nervous temperament through falling off or accidentally stepping out over.

At the outset of taking charge of a big machine, one of the printer's great difficulties is its size. A new hand feels lost, as it were, and is inclined to think the sheet he is printing is as big as the side of a house. This feeling soon wears off, and in a little while a 60 × 40-in. sheet becomes quite an ordinary size.

Any litho machine minder who aspires to be the successful caretaker of a large machine must be prepared to give the greatest attention and more than ordinary care to his work. A big stone goes wrong so easily and takes so long to get right again. The appearance of an otherwise good job is spoilt by the paper stretching, or a stone is smashed through not carefully adjusting the before-mentioned seven tons of pressure.

The greatest difficulties to be encountered, however, in working a big machine are those over which the printer has little or no control. Among others are the use of cheap, poor, or indifferent inks; and thin, brittle, soft, spongy, creasy, or easily-stretched paper. The evils connected with the use of the above are too well known to need special mention now. Creasing and stretchable paper may be got over to some extent by hanging it up for two or three days, or longer, previous to working, or by running it through a hot rolling machine once or twice. The greatest generals have been those who have won their battles fighting against the biggest odds; likewise the best workmen are those who can turn out a good job in spite of poor or indifferent materials to work with.

Every litho machineman worthy of the name is careful to have his pressure even and not to have too much on at the starting of a job. If he values his peace of mind, he will be extra careful in making ready when he has stones costing £10 each or more to print from, and drawings on them perhaps costing an additional few pounds. A careful printer will not be satisfied with using the straightedge alone, but will use the spirit level as well in getting the pressure, to make sure it is correct. In working large stones, it will be found an advantage to work with a trifle more impression at the front or grip edge than at the back. The inking rollers lose some of their freshness by the time the front edge of a large stone is reached; the printed sheet in consequence looks fuller of colour at the back than at the front. Something is needed to counteract this, and a slightly higher pressure at the front will generally put it right. Pressure will also have to be moderate in working the colours of a job on unstretched paper. There ought to be enough pressure when the weights or cylinder bearings just rise as the cylinder goes over, shewing that the cylinder is resting fairly on the stone during the impression; this will help to reduce breakages of stones to a minimum, as well as ensure fairly good register. Of course, if the black of a job is being worked or a heavy solid is on, put on as much pressure as you think it safe to work with. "He that works easily works successfully," is as true of litho machine minding as of most other trades and professions.

In starting a job, endeavour to make a good beginning. "Well begun is half done." Don't start before you are ready, or it will be found that "more haste is less speed." As far as possible, see that everything is done that can be before washing off the gum and cleaning out the stone, so that when a start is made printing can proceed right away as soon as possible. Dampers should be well scrubbed and in good order; much depends on proper damping. Roller slides should be set; have a good supply of ink in the duct, but don't have it too thin at first; it is easier to reduce ink that is rather too stiff than it is to stiffen ink that is too soft. A machineman doesn't want to spend too much of his time at the back of his machine mixing ink whilst printing the first ream of a job. If about to work a tint, try to have enough ink mixed to work the job right through, so as to have it all one shade. When the lay is right, pull a "miss" on the cylinder and overlay the solid portions of the work with a piece of paper if thought necessary. A little time spent in seeing to these matters is time well spent. Should delays occur in making ready, don't leave the stone out of gum too long; it will hinder you a few minutes perhaps, but will prove quickest in the long run. Before proceeding right away, see your stone is properly locked and that there is no chance of the side lay working loose. Poster work artists, as a rule, are pretty lavish with the colour in big work, whilst the inks used are of the cheapest description. The printer is expected to produce a good effect in brilliant and solid colours all the same; they need to be brilliant and solid colours to withstand the combined action of the billposter's paste, the sun, and the rain. Poster inks, as a rule, won't stand too much reducing with litho varnish; if satisfactory results are to be obtained, boiled oil and other substitutes will have to be used. Care will have to be taken that the sheets do not stick together, or there will be trouble.

After all has been said, there is nothing like one's own experience. Every litho machine minder has his own little secrets and wrinkles. Let this be a golden rule: profit by your mistakes and learn by your failures. A man can be excused for making a mistake or having a fluke now and then; when oft repeated they are blunders, and inexcusable. MACHINE MINDER.

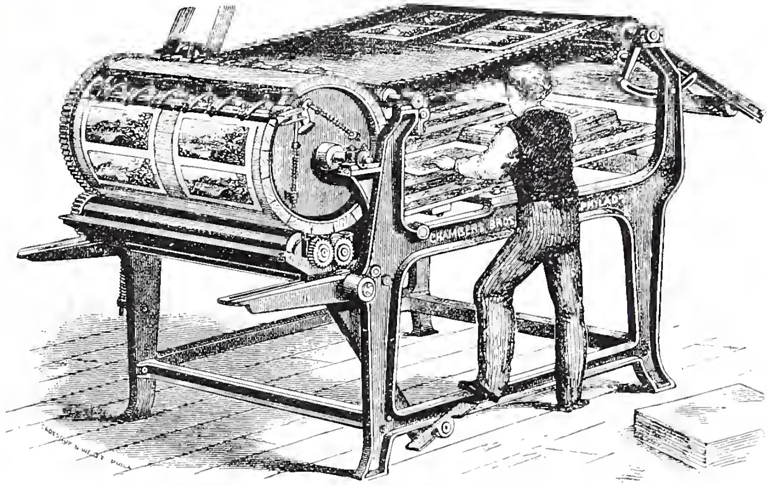
THE American machinists, Messrs. Fuchs & Lang, have forwarded to us one of their catalogues of lithographic machinery. It is quite impossible in this brief notice to give any idea of the nature of its contents, and in subsequent numbers of this journal many of the items of interest will be fully discussed. As to the production of the catalogue, it is excellent. Every machine is beautifully illustrated on one page, whilst it is described on the opposite side. Each page has a faint trace of ornamentation on it, in pale tint. The whole is a good example of printing, and is bound in deeply-embossed covers, tied together with a silk cord.

Varnishing by Machinery.

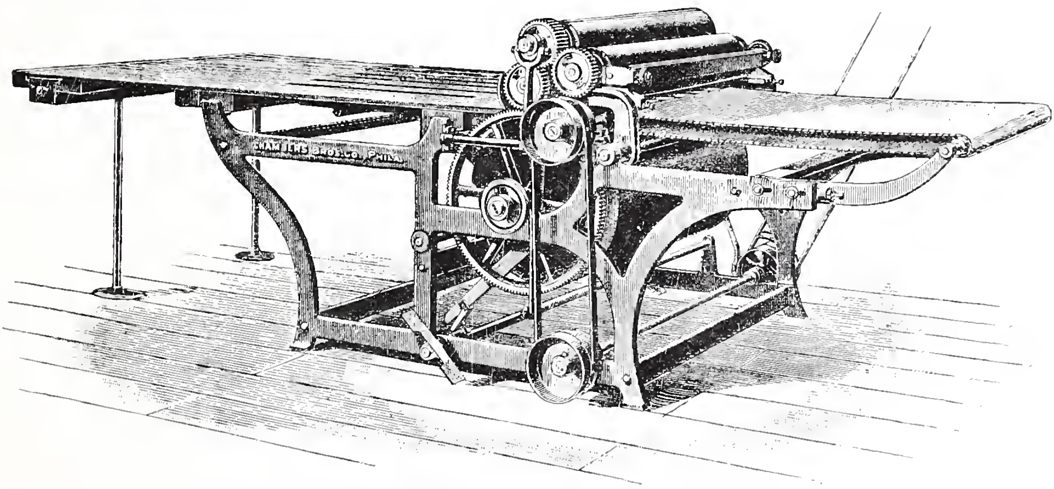
A LONG felt want in the printing trade has apparently been supplied and used in America for the past fifteen years, whilst English firms continue to employ the slow, irregular, and disagreeable hand methods of varnishing. Varnishing by machinery has been well thought out in England but never practically applied. In America, on the contrary, a practical printer named Mr. R. McNamee designed a machine for this purpose, and assigned his invention to Messrs. Allen Lane & Scott, printers, in Philadelphia. The machine, with a number of recent improvements, is now manufactured by Messrs. Chambers Bros. Co., 52nd-street, Philadelphia, and includes the patents issued to Messrs. Allen Lane & Scott in 1877 and 1878, and to Messrs. C. & S. B. Chambers in 1881. Although the machine is nominally for varnishing, yet it is adaptable to gumming and sizing as well. What they claim for the machine, in the first place, is that the varnishing is done without previous sizing.

A glance at the illustration shows how simple the mechanism is, and how readily it can be adjusted and worked by persons of little or no experience. The sheets are fed as in the cylinder press, and in the act of passing under the cylinder, the varnish is applied by a feeding roller. The sheets then pass over the cylinder on to a continuous apron, which delivers them to a person who takes them away to spread out on drying racks.

The fountain for the varnish is well constructed. There are appliances to it by which the varnish can be mechanically mixed in the fountain, and can be drawn off for the substitution of other varnishes. The fountain can be blocked with stops, so that only a sufficient length of the varnishing roller gets fed to cover the width of the paper to be varnished, and the packing of the cylinder is secured by clamps and an oilcloth tympan sheet extending round the cylinder and winding on a reel. Thus tacking is obviated, and the cylinder is kept clean and smooth. Not only are there means of side regulation to cover the space required, but a steel "doctor-roller" also regulates the quantity of varnish taken up, either a thick or thin layer of varnish being applied at will.



MACHINE FOR VARNISHING CHROMO-LITHOGRAPHS.



MACHINE FOR VARNISHING LITHOGRAPHS ON SHEET METAL.

The speed depends upon the ability of the feeder. There are speed pulleys attached which will give a revolution of one thousand sheets per hour.

The gumming adjustment, made of brass rollers, also permits of sizing on one side only. The machine is made in two sizes, both of which take 48 inches in length, whilst one takes sheets 22 inches wide, the other 44 inches wide. The makers supply the machine on trial on the most generous conditions. The shipping weight is just over one ton; the floor space of the smaller machine is 3-ft. 8-in. × 6-ft. 10-in., and of the larger machine 5-ft. 6-in. × 6-ft. 10-in.

In any large firm where varnishing is a daily custom, the price of the machine should not be an obstacle. The larger machine is £150, the smaller one £120, with an extra charge of £10 for the gumming attachment.

We have received samples of varnishing by these machines, and can express our entire satisfaction with its evenness and thickness. In America there are many firms using these appliances, and in Scotland Messrs. T. Nelson & Son have them.

The same machinery ean be used for varnishing lithographs on sheet metal, but the same firm has constructed another form of the machine which permits of the sheet metal being varnished flat, instead of having to pass round a cylinder.

It is only those who know the effects of varnishing who can appreciate the value of a mechanical device which, in some degree at least, mollifies its injurious effects. In large varnishing rooms, the females employed who use the spirit varnish get thoroughly overcome with the effect of breathing an atmosphere full of methylic spirit or wood naptha, whilst others employed in or near such rooms suffer most acutely by the pungent spirit attacking the eyes. Everyone knows that methylated spirit dries at a great speed when put upon the skin; such drying process robs the skin of moisture, and permanently produces a hardened, unhealthy skin, which throws a vast amount of work on the kidneys, and ultimately overtaxes them.

Machinery of the nature just described gives very little chance of this, for the amount of varnish in the fountain has no opportunity of impregnating the air, and the sheets themselves, whilst drying, are not so much the cause of the mischief.

"Plant Form" Supplement, No. 4.

SOLOMON'S SEAL, or King's Signet, is one of the most graceful of our hardy perennials. There are several varieties, one having variegated leaves and another a giant species. It is a great acquisition to the conservatory, as with a little heat it may easily be forced to flower early in the year. It is also a hardy plant for the shrubbery, in shady nooks, and is one of the few plants that will grow well under trees. When planted in good deep soil few things are more effective than this plant, with its gracefully curved nodding leafy stems, set with clusters of drooping bell flowers, which, later in the season, are often succeeded by dark greenish-black berries, reminding one of black pearls, and still later its leaves die off to a glowing yellow colour, so that in all its phases this plant is of marked beauty.

Annual Excursions of the Printing Classes.

ONE of the treats which the pupils of the Manchester printing classes always look forward to with unlimited pleasure is the generous way in which several firms invite the classes to visit their establishments, and see for themselves the practical demonstration of the processes which cannot be seen in every little firm or town. As in previous years, the *Manchester Guardian* office was thrown open for the pupils to see the setting, stereotyping, and machining of the fourth edition of the *Evening News* on Saturday, April 9th. The typefounding establishment of Mr. J. Heywood, which is now growing into considerable importance, as well as the electrotyping works, were both visited by the pupils on April 11th and 29th.

Unfortunately, through a temporary stoppage of the paper works, the pupils, who assembled in large numbers, were debarred the opportunity of a visit which has always been looked forward to with such interest in previous years.

But the visit of the year—to the machine making works of Messrs. Furnival, at Reddish—was attended with all the pleasures and instructive elements which have always characterised this excursion. The pupils gathered in large numbers, and went out by train, making a start about 3 p.m. on Saturday, April 23rd, in several groups, under the leadership of several of the well-known members of the firm and staff. After seeing the way in which every detail of a machine is made, and the accuracy with which every part is fitted, the firm invited the visitors to partake of a substantial tea. After the tea opportunity was taken of expressing appreciation of the reception given, and the party returned to Manchester full of enthusiasm and delight.

It is needless to add that advantages such as these are the proper means of instilling a thorough practical knowledge of the technology of the trade. And the more that is learnt of other trades the more fully do folks in general understand that cheapness means one of two things, viz., scamping the work and the production of poor articles, or that men are working at miserably low wages, which are not adequate to the skill of their productions nor sufficient for their bodily subsistance and mental improvement.

WE note with pleasure that Mr. T. B. Widdowson, of Leicester, who is known to many readers of the B.L., has been successful in winning one of the first prizes (value £25) in the competition instituted by Messrs. M. Nairn & Co., linoleum and floorcloth manufacturers. The competition was a very spirited one, no fewer than 1,080 designs being sent in for adjudication.

THE *Art Decorator* for April and May gives some good plates of Japanese costumes, scroll work, tiles (with designs of the arts), painted wood carving, Moorish stained glass, allegorical friezes (by G. Sturm), marine decoration for a fountain, and designs for the seasons, all, as usual, well-printed coloured plates, full of suggestive material for the designer.

Supplement to "The British Lithographer."

PLANT FORM.—No. 4.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

DE MONTFORT PRESS.

Specimens.

[*Will our friends kindly remember to send their specimens either* TIGHTLY ROLLED *or* FLAT BETWEEN BOARDS; *the cost is but a trifle more, and for review they gain in being presented as they came from the machine. If sent unprotected, specimens are usually so crushed and disfigured as to be utterly unfit for criticism or preservation.*]

A COLLECTION of lithographed specimens from Messrs. Chorlton & Knowles, Manchester, consists of illustrated catalogues of Manchester goods, labels, and business stationery, shewing a wide range of commercial work. A notable feature all through is the sharpness of outline and clearness of detail of both lettering and pictures, whilst the ornamentation is always not only judiciously subdued, but appropriate and tasteful. The colour treatment is equally good, especially in the tints, which are invariably distinguished by clearness, brilliancy, and solidity. Right through the collection there is evident a determination to produce the best possible results, and in this Messrs. Chorlton & Knowles have been eminently successful—better work, artistically and technically, could scarcely be desired.

MESSRS. HORROCKS & Co., Ashton-under-Lyne, have reproduced in handsome style, as a presentation calendar, the fine picture "Deeds of Brave Dogs," by A. M. Rossi, R.A. It is an oblong design, measuring about 28 × 16-inches, and shews a bonny little lass reading the book of "Brave Deeds" to her big four-footed companion, who is looking as interested as though he understood and appreciated it all. The drawing and colouring of the picture are intensely life-like and natural, and the technical execution is simply perfect, reflecting the highest credit on Messrs. Horrocks & Co.'s artists and printing staff. "Deeds of Brave Dogs" will, no doubt, when issued, be immensely popular with the little folks.

MR. E. T. BEAL, Hull, writes strongly in praise of the plates of the Patent Litho Zincplate Co., and submits some excellent specimens of his own work done on them. The collection includes some examples of fine lace work photographed direct on to the zinc plates and printed direct from the photograph, and of which long numbers were printed without any apparent deterioration of the design. Other excellent specimens are reproduced from litho-printed impression direct to zincplate, and the sharpness of outline and clearness of detail everywhere tend to shew that these plates can be thoroughly depended on when once their peculiarities are understood.

SPECIMENS of commercial stationery, labels, invoice headings, and wine lists, from Messrs. Stoole & White, lithographers, Hull, are excellent in every way. The designs and ornamentation are tasteful and effective, the lettering neat, clean, and well proportioned, and the detail and outline generally of a character showing skilful workmanship, whilst the printing is simply perfection in solidity and sharpness. The colour work is equally good, and is noticeable for exact register and the brightness and brilliancy of the colours used.

FROM Herr C. G. Naumann, Leipzig, comes a bulky collection of lithographic specimens, including illustrated catalogues and price lists, show cards, examples of transparencies, and business cards and invoices, all executed in excellent style. The designs are in most cases fresh and attractive, and the colouring bright and effective. The most taking examples in the parcel are some royal showbills in black on grey ground sparingly picked out with gold, and enclosed in a plain line gold border with neat floriated corners.

MR. G. L. HENDERSON, 32 King-street, Cheapside, E.C., is a master in steel and copper engraving. Half-a-dozen new business cards just executed shew the effective taking style of design, the correct form, and fine tasteful finish for which he has such a high reputation, whilst the printing is simply exquisite in its clearness and sharpness. All he does is, in fact, strikingly characteristic of the finished artist.

FROM specimens seen at the office of Mr. Edward C. J. Wright, lithographic artist, of 9 Warwick-court, Gray's-inn, who for many years was marine artist with Messrs. Maclure & Co., London, we should say that a more well-informed man on the technicalities of marine subjects would be difficult to meet with, and his work is as tasteful as it is nautically perfect.

THE invitation circular (8vo oblong) to the organ recital in Trinity Free Church, Aberdeen, printed by Messrs. Tayler & Henderson, is a very artistic bit of chalk work in warm brown tones and half-tones, with an admirably executed portrait in an oval border on the left side. It was transferred and proved by Mr. Wm. Guild, and is excellently printed.

SPECIMENS received from Mr. C. Elvidge, writer, draughtsman, and designer, 3 Freeman's-court, Cheapside, E.C., ranging from a plain written circular to an elaborate showcard in colours, shew him to possess excellent taste and practical skill in his profession, and he may confidently be relied on to give satisfaction in any work he may undertake.

A NEAT circular from Messrs. Sanderson & Clayton, Wakefield, informs us that they have commenced business at Kirkgate and Pincheon-street, as lithographers, manufacturing stationers, and bookbinders. The circular, which is printed in two shades of green and gold on white paper, is a creditable specimen of inexpensive work.

THE business cards and circular submitted by Mr. A. S. Farrell, Liverpool, are not only tastefully designed and well drawn, but are excellently printed. The large card shewing sketches of scenery, shipping, &c., is in a free fresh style evidencing much practical facility with pen and pencil.

MESSRS. ROYLE & SON send us proofs of a very effective engraved heading, done for a provincial firm, which is as attractive and taking in design, ornamentation, and lettering, as it is admirably executed. Messrs. Royle & Son maintain a very high standard of taste and finish in all they do.

Trade Reports.

(From our Special Correspondents.)

London.

A GRAND complimentary concert was held on Thursday evening, March 31st, at the "Old Parr's Head" Tavern, Knightrider-street, E.C., on the occasion of Mr. William Burton retiring from his position as manager of the printing department of Messrs. Maclure & Co., Queen Victoria-street, E.C. During the evening the chairman, on behalf of the employées of Messrs. Maclure & Co., presented Mr. Burton with a handsome silver tea service, and an illuminated address. The address expressed appreciation of Mr. Burton's work during the seventeen years he had been with the firm, as well as his personal qualities, and thanking him for his uniform courtesy, and testifying to the energy and ability with which he had performed the duties devolving upon him. This address was signed by the whole of the employés of Messrs. Maclure. Mr. Burton replied suitably, thanking the donors and friends for their kindness and this evidence of their esteem. An excellent programme (which reflected great credit upon the committee, Messrs. Schloch, Stokes, and Winter) of singing, piano and cornet solos was received with evident satisfaction by all present.

Liverpool.

LIVERPOOL POLYTECHNIC SOCIETY.—Recently, at the third meeting of the fifty-fifth session, held at the Royal Institution, Colquitt-street, Mr. Thomas L. Miller, Assoc. M. Inst. C.E. (president), in the chair, Mr. Joseph Goodman read a paper on "The Art of Lithography." After giving a brief history of lithography, the technical laws governing the application of lithography were discussed, and its connection with the science of chemistry pointed out. The utility of lithography and its varied application to trade and commerce were then referred to, and stress was laid on its influence in cultivating a popular taste for art. The development of lithographic machinery, and the subdivision of the labour required was then dealt with, and the need for technical education in the subject indicated. The defects from which lithographic prints suffer were then detailed, and the analogous processes of printing on fabrics and on tin, printing from engraved stone, copper and steel plate engravings, zincography, &c., were fully explained, and specimens of different kinds of work exhibited. A discussion followed the reading of the paper, and a hearty vote of thanks to Mr. Goodman brought the proceedings to a close.

Edinburgh.

IN November last, the Edinburgh branch of the Amalgamated Society of Litho Printers issued a circular requesting a revision of the hours of labour, and also of the rate paid for overtime. For some time an anomalous condition of things has been in existence here, a number of firms working 51 hours and others 54 per week for the same minimum wage. The branch requested 51 hours to be generally conceded, and the all-round rate for overtime to be time-and-a-half, and, as a result, a compromise has been effected of $52\frac{1}{2}$ hours in establishments which have hitherto worked 54 hours, while the branch also insisted on an increase of 2/- weekly on the minimum wage of all working over 51 hours. The request for a uniform rate of time-and-a-half for overtime has been practically granted. With the exception of several small and unimportant firms these concessions have been general, and as one result of the agitation over fifty per cent. of the trade work 51 hours weekly. Trade is fair all over, but no pressure of work on hand. The percentage of unemployed during the past month has been just over three.

ON the 7th April the firm of Messrs. R. Home & Son, one of the oldest and largest lithographic establishments in Edinburgh, ceased to exist. Established so far back as 1829, this firm has always had a high reputation for the excellence of its printing, more particularly in music work. Within the past two years this firm had successfully introduced zinc as a substitute for stone, not only for originals, but for machining. Various causes may have contributed to hasten the failure of the firm, such as a serious fire which occurred about eighteen months ago; the expense incurred in perfecting the zinc process already alluded to; and competition with Germany, particularly. The extinction of the firm is a matter for general regret in the trade, the employées always receiving good treatment, and the house was one of the best Society establishments in the city.

THE sale of the plant of Messrs. Home & Son took place during the second week in May, and extended over three days. Most of it was bought by local firms.

IT is now certain that the business for which Messrs. Home were famed is not to become altogether extinct in Scotland, as a new firm, The Tessaro Printing Association, have leased the premises, and propose to carry on the same kind of business, and their intention is to even further extend and perfect the zinc process already alluded to. This company have the sole right in Britain to an engraving process for music. This process depends for its success on the adaptability of zinc as a substitute for stone. They have already established a high reputation for work of this kind. Perhaps a further and more minute account of the process may be given later.

TRADE is "fair" just now, and a number of firms are increasing their staff of men and adding additional machinery. One firm, Messrs. McLagan & Cumming, who have established a reputation for high-class work, have recently removed into the suburbs, where the commodious premises and improved arrangements will enable them to increase their already high reputation.

THE number of unemployed during the past month has been about four per cent.

THE coloured and tinted supplements in THE BRITISH LITHOGRAPHER seem to be greatly appreciated, and the demand for the magazine is surely progressing.

STOCKPORT.

EMPLOYEE'S SOIRÉE AT STOCKPORT.—On Saturday evening, March 12th, the workpeople engaged at the Atlas Paper and Printing Works, Heaton-lane, Stockport, were entertained to tea by their genial and thoughtful employer and his wife, Mr. and Mrs. W. Bramhall. The soirée was held in the room at the works generally used for hand paper-bag making, and a company numbering close upon 200, including wives and friends of the employées, sat down to the repast, which was thoroughly enjoyed. Afterwards the tables were cleared away, and preparations made for spending the evening with singing, dancing, and general enjoyment. Mr. J. Barrodale occupied the chair, and opened the proceedings with a few appropriate remarks, commenting upon the kindness of Mr. and Mrs. Bramhall, and wishing them every success for the future. At a later period of the proceedings Mr. Townsend, one of the officials at the works, proposed a vote of thanks to Mr. and Mrs. Bramhall for their kindness that evening, and thanked them very heartily on behalf of himself and fellow-workers. Mr. Davies seconded this, and the motion was carried with acclamation. Mr. Bramhall replied, thanking the company for the hearty manner in which the vote of thanks had been passed, and pointed out that such occasions were of mutual benefit and interest. The programme was of a very interesting character, agreeably interspersed with dancing and games. The whole of the artistes contributing to the programme were employées of Mr. Bramhall.

DERBY.

THE litho trade here is "moderate," but no union members are unemployed.

THE Derby Trades Council (which recently succeeded in placing two of its members on the School Board—one of them, Mr. T. Mawbey, printer, was returned at the head of the poll) are in favour of an eight hours day for miners and certain railway employés, but not for general workmen. At a recent meeting, a letter was read referring to the struggle in Leeds and Bradford, against an attempt on the part of some of the employers to break up the trades union societies, and the council was requested to move a vote of sympathy with those men who were fighting against such an unprincipled action. Some discussion ensued, and Mr. Clarke moved, "That this Council has considered the rules of the Yorkshire Master Printers, Typographical, Lithographical, and Allied Trades Association, and are of opinion that the object of the association is to break up the Typographers, Lithographers, and Book Binders Trades Unions, and tenders sympathy to the lithographic printers of Yorkshire, who are fighting against this most unjust and unprincipled action on the part of the masters' association." The vice-president (Mr. Wm. Hadley) and treasurer (Mr. T. H. Wigley) of the Trades Council are both printers, and the assistant-secretary (Mr. J. Clarke) is a lithographer.

NORWICH.

THE lithographic business is improving here. Messrs. Jarrold & Sons have set a good example by adopting the weekly half-holiday for their shop assistants.

SHEFFIELD.

TRADE here is fairly good in lithography. Several new machines are being laid down. We have only two members out of work out of a membership of sixty.

THE firm of Messrs. Goddard & Smith, Vicar-lane, have given up business. They were lithographers, and their speciality was stone-grate pattern printing, in which they excelled. The plant has been purchased by Messrs. Garnett & Co., of the *Rotherham Advertiser*, who are embarking in this line of business.

THE new premises of the *Independent* are approaching completion; they will do credit to the firm and will be an ornament to our principal street, "Fargate."

JUDGING by the energy the various firms are showing, lithography will be better represented in Sheffield than for many years past, and it is about time, as a great deal of work has been allowed to leave the town that could and ought to have been done at home, through the apathy of employers in not advancing with the times in the matter of machinery and material.

THE subscribers to the B.L. speak very highly of the journal and hope it will maintain its character.

SOUTHAMPTON.

PRESENTATION TO AN ORDNANCE EMPLOYÉ.—A presentation of an interesting character took place at the Ordnance Survey Office, Southampton, on Tuesday, April 12th, when Mr. Rudolph Appel received, on his retirement from this scientific branch of the Civil Service, a practical expression of the esteem in which he is held by the whole of the employés of the zinco-printing department. Major Johnston, R.E., made the presentation, which took the form of a handsome study chair and cushion, and assured Mr. Appel of the goodwill which they felt towards him, coupled with the hope that he would enjoy rest in the chair for many years to come. Mr. Appel, who was most cordially greeted, returned thanks for the kind present, and said that during the thirty-four years he had spent upon the survey, he had done, he hoped, his best to please all in the department, and if he had not always succeeded, then he hoped that he would be forgiven. It was his best wish that good health and prosperity would attend them all.

ABERDEEN.

TRADE here has been fairly good in the past season and shows signs of improving.

THIS year we are to be overwhelmed with illustrations from the Royal Academy pictures. It is remarkable how this custom has grown to its present magnitude. Only a few years ago, Messrs. Cassell published one volume of the pictures, and the *Pall Mall Gazette* followed suit. This year, Messrs. Cassell are publishing four large numbers; and the *Illustrated London News* and *Graphic* have put in large supplements for two or three weeks in succession of nothing but Academy pictures. One thing we do fall out with, and that is printing them in such a variety of tones. It simply takes away the quality of the pictures. In black, everyone can add his own imaginative colouring; but when a warm subject is printed in a cold colour, it is decidedly misleading.

Silicate of Potash.

FOR STIFFENING PRINTING INKS.

DON'T use it in every ink for machine work. The silicate has its proper place, and in its place has considerable value. Samples of work in which silicate has been employed vary according to the paper used. In those where a fairly porous paper has been used, the impression is perfectly clear, it will not smear nor set-off, and has a sharpness and brilliancy not generally obtained on a similar class of paper. The same ink on a bright enamelled paper, or on any of those highly-coloured papers which appear as though they had been varnished, is quite unsuitable. The old-fashioned notion that if an ink is too thin to print on these hard-faced papers it is necessary to add stiff varnish, is giving place to a more rational mode of procedure. The addition of stiff varnish certainly holds the ink together, and would probably suit were it not for the common quality of paper so generally used. The ink thus strengthened with stiff varnish tends to tear the paper, and it leaves only two or three courses open to the printer. First of all he may add a volatile oil in small quantity. Secondly, he may add a small quantity of flour paste and very little thick varnish. Or, thirdly, he may add a very minute quantity of silicate of potash to thicken the ink, and a small quantity of paste to give sufficient adhesive power. The silicate should be added in drops, or half drops, at a time, until the necessary thickness of ink is obtained.

THAT printers are finding out the value of zinc plates in substitution for litho stones for most kinds of work is only natural when one considers the many advantages that favour the more recent process. Planished, grained, and polished plates are being prepared from the finest quality of zinc, in large quantities, by Messrs. B. Winstone & Sons, at 100 and 101 Shoe-lane, E.C., for use by lithographers, music printers, zincographers, and photo-zinc engravers. These plates may be had in thicknesses varying by gauge from No. 8 to No. 18, with wood mounting blocks, well clamped, and made of well-seasoned teak, mahogany, or birch, at prices calculated per square foot. As against the rather high prices for good Solenhofen stones, these plates are certainly much more economical, and in practical use the results generally are almost equal. The new price list of Messrs. Winstone includes all necessaries for the many new processes of phototype and collotype, photogravure, and zinco-typography.

FIRE recently wrecked the plant of Winter's Art Lithographing Company, Springfield, O., who hold the contract for all the World's Fair lithographing, and part of the original stones for the Fair work was destroyed. Loss on stock and completed work, \$40,000; on building, \$10,000; on machinery, \$25,000; insurance, \$5,000 on building, \$20,000 on stock, and \$25,000 on machinery.

Prepared "Line" Papers for "Process" Work.

THE illustration, "The Museum, Maidstone," in this issue, will be of interest to our readers. It is not generally known that Messrs. Cornelissen & Son, Great Queen-street, W.C., have placed on the market a series of ready-prepared "line" cards, which take the place of the process engraver's screen plates. The lines are in various degrees of fineness, and the card is prepared with a chalky surface, which is readily removed by a knife or other sharp instrument. The lines are printed in jet black on the prepared chalky surface in parallel lines close together, and then embossed in indented lines the reverse way—*i.e.*, crossed, giving a serrated appearance. The artist begins by putting in the dark touches of his proposed sketch, by drawing either with black crayon, liquid Indian ink, or lamp black, providing he does not put a flat wash, then scrapes out the high lights clean, taking the printed black line of the ground right out; a half scrape producing the quarter tint, as in the sky of the picture. The whole process is quickly mastered by the artist, as may be seen when it is stated that the specimen we print was easily done complete in less than four hours. The price of the card is 4/- per sheet 25×19 inches or 2/- per sheet $19 \times 12\frac{1}{2}$ inches. The result, as can be seen, is a very good imitation of a half-tone block. The original picture was about twice the size, and has been photographed down to the size of our page. Full particulars about the "photo-zinco tint cards" and the methods of using them can be obtained of Messrs. Cornelissen & Son.

AT the present time, photography has obtained a firm footing in the scientific world. All the branches of natural history, and in particular those appertaining to mineralogy, the medical sciences, physiology, and micrography, have recourse to photography to register their discoveries and record their wonders. Astronomy, archæology, and the fine arts, equally find its value to reproduce the subjects of study in a faithful manner, and besides the information which photography assists to bring within reach, it furthers the spread of knowledge, both scientific and artistic, by providing a rapid and economic method of reproduction. It is by reason of this exact reproduction that photoprints will eventually become the indispensable auxiliary as well as the servant of the artist, as well of the master as the pupil. In the branches of industry, phototype printing is taking its place alongside the branches of lithography and engraving, and its work is seen to advantage in the truly artistic and tasteful productions its votaries are enabled to turn out.—*La Typologie-Tucker.*

MONSIEUR HENRI JULLIEN, of Brussels, has forwarded to us his English catalogue of lithographic and letterpress machinery. The machines are all well illustrated, and much information can be gained by looking over the various types of machinery used in different parts of the world.

The Museum, Maidstone.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

The Rise and Progress of Lithography in Britain.

BY PHILIP BUTLER WATT.

How the new art of lithography extended to Scotland and to Glasgow is said to be involved in much obscurity, and much mystery has been thrown round it, but there can be little doubt that amongst the earliest practitioners of it, if not the earliest, was Hugh Wilson, who must always be associated with the introduction of lithography into Glasgow. Wilson was born in 1797, and was apprenticed to one Lumsden, an engraver and printer in Glasgow. It should be explained that before the advent of the lithographic art, all commercial work, such as bank notes, bills of lading, billheads, circulars, labels, &c., &c., were all engraved on and printed from the copper plate; even book illustrations, with the exception of wood engravings, were all done on copper and printed on the copper-plate press, and it may be imagined what a tedious and slow process, as well as an expensive one, it was. The professors of this art were called engravers and printers; such a one was Hugh Wilson. He had succeeded to the business of his employer, Lumsden, and being somewhat of an advanced man in his business, had heard of this new art of lithography, and had either taught himself or had received instruction somehow, that so far back as the year 1816 he had begun to practise it and introduce it into his business. He so far succeeded that in a short time it began to take the place of copper-plate printing, the writing or subject being first engraved, then transferred to the stone, and multiplied by the lithographic process on the stone. This was a great advance on the old plate process, and immediately began to revolutionise the art of printing, so far as the plate process was concerned, and as the new art advanced and developed itself, drawing and writing by the litho process began to be universally adopted for all commercial and artistic purposes, instead of engraving. Wilson practised all kinds of work and communicated it to all uses of such work, extending it till it grew and advanced into colour work and colour illustrations. He was the first to produce what is now so common, viz., an illustrated almanack, which he used to give to his customers annually. His place, in 1829, was at the corner of Stockwell-street and Trongate, where he assumed the name of engraver and lithographer, and when his business increased he took his son-in-law, Mr. Woodrow, into partnership, and he, later on succeeding Wilson, founded the well-known firm of Woodrow & Sons.

Some have attributed the introduction of lithography into Glasgow to Thomas Hopkirk, who was a man of means; and this may account for his connection with the art at all, which must have been first that of an amateur getting a stone and materials from London to learn with. Be that as it may, it was after Wilson's date that he made it a profession and business, carrying it on in conjunction with one of the name of Cleland under the title of Hopkins & Cleland, and latterly with one of the name of Watson, under the title of I. Watson & Co., who published at this time a comic illustrated paper called *The Mirror*. Thus early, in 1826, it may be noted that comic papers were produced in Glasgow, and lithography employed in illustrated journalism. Cleland, when he left Hopkirk, knowing he had a good thing in hand, began business himself in Virginia-street, where he carried on the art of lithography for a number of years with success, and was succeeded by James Miller, who was originally a teacher of writing, and his ability in this line led him into lithography. Miller requires

MICHAEL HANHART.

more than a passing notice at our hands, as it was in his establishment that some good lithographers of their day were trained, such as W. Allan, Andrew Maclure, A. McDonald, and some other well-known Scotch names, and therefore he must have been a man of no ordinary capacity, practising the art in all its various artistic as well as commercial features, advancing with its development, and helping it so to spread as to become a recognised industry in Glasgow.

Amongst the other early practitioners of the art in Glasgow was Thomas Paterson, also a penman. This was as early as 1825, and though his work never rivalled Miller's, the name is notable from the fact

that his place was recognised by his having a sign over the door with a portrait of Senefelder painted on it. His place was first in the Trongate, then in Brunswick-street, but wherever he migrated, this sign always accompanied him and marked the place where Senefelder's art was practised. In 1835, W. Allan, an apprentice of Miller's, began business, and was shortly afterwards joined by W. Fergusson, an engraver, and they carried on business under the title of Allan & Fergusson. They greatly extended the art in commercial as well as pictorial work. It was in this establishment that Mr. W. Simpson of the *Illustrated London News* (Crimea Simpson) received his training, and was employed by them in his early days, before he joined the staff of W. Day & Sons, London. Here also was trained Mr. R. Carrick, previously mentioned as the artist of Turner's "Blue Lights" and other works, and the art must ever be indebted to this firm for those productions.

Here we must take the opportunity of making a few remarks upon the beneficial effects of lithography in helping to develop the manufacturing industries of Glasgow, and, in a measure, to forward its prosperity. Glasgow was at that time to all intents and purposes a cotton manufacturing district, and among kindred industries were those of cotton spinning, weaving, and cotton printing, or calico printing. In all of these industries lithography entered largely into the product in supplying labels and marks and decorations of an ornamental character, to be put on the made-up goods. This could not have been done to any extent by the old and slow copper-plate method. Consequently, ornamental and bronzed label work of all kinds was produced by lithography, enhancing the sale of these goods and giving a great impetus to the trade in both directions. Yet another impetus was given by lithographic art to a new industry created at that time in Glasgow, called the "sewed muslin" trade. All the patterns of this sewed muslin work were at first stamped or marked in a pale blue colour on the muslin by means of a wood block engraved with the pattern desired, and all stamped by hand and called block printing; this was done for the purpose of shewing the design required and for the guidance of the sewer. This operation being both slow and expensive, limited the industry, but the advent of lithography developed a better and quicker process. The design was lithographed and printed on the muslin, and thus the design originally drawn on the paper was transferred and multiplied on the stone, so that large quantities of these patterns were printed at little cost, greatly facilitating and spreading the industry which had been previously confined to a few block-printing houses. Pocket handkerchiefs were also printed in this manner, and it thus became a regular and busy trade. Grained zinc was often used to print this kind of work, being less expensive than large stones. Also large presses of a peculiar construction were used, and small rollers substituted for the scraper usually employed. But this trade is now almost extinct, by the fact that no colour so printed in lithography could be made "fast" or binding, so as to allow the fabric to be washed. There was also an attempt at this time to print dress goods, such as muslins and calicoes, by lithography, and there were some most beautiful patterns of flowers and leaves *en bordure* done on muslin. But this process also failed by reason of the colour not being "fast," and consequently liable to wash out. Let us echo a hope that some day some ingenious chemist may find a mode of fixing litho colours so as to be made amenable to muslin and calico printing, then indeed would this be a chapter in lithography for the future, and not one of the past.

One of the most enterprising firms in the lithographic art and of the early times was undoubtedly that of Messrs. Maclure & McDonald, both of whom served their apprenticeship with Mr. James Miller, as already noticed. They began business together in Glasgow in 1835, Mr. Maclure devoting his attention almost exclusively to the artistic part of the business, while Mr. McDonald attended to the commercial and circular writing. The business prospered so much that in a few years they opened a branch establishment in Liverpool, taking in a fellow apprentice, Mr. A. McGregor, as a partner to look after it, thus forming the firm of Maclure, McDonald & McGregor. In 1845 they opened a house in London, which was managed and carried on for a number of years by Mr. Maclure, the senior partner of the firm, where the singularly finished and artistic character of their work soon made itself manifest in the increasing extent of their business. The London business was carried on by Mr. Maclure until his death in 1885. The parent business was conducted in Glasgow by Mr. McDonald. The character of the work there is so well known that it is hardly necessary to dilate upon it. But attention may be called to the fact that the firm of Maclure & McDonald carried commercial lithography to a very high state of perfection, and made Scotch commercial art in lithography a good name wherever it was seen. They were the first to erect a litho printing machine in Scotland (in 1856), which was one made in Berlin by Seigel.

Amongst some of the other early practitioners of the art who flourished at this time we must not forget to mention Allan & Fergusson, who began business about the same time as Maclure & McDonald, and whose work was of a very high character. Allan was also a pupil of Miller's, of whom we have already spoken. The reputation of the firm stood very high in commercial lithography. Another firm must also be mentioned, that of Gilmour & Dean, as early in the field for what may be termed decorative lithography, manufacturing largely bands, screeds, etc., for the Belfast linen trade, now largely given to foreign competitors.

How lithography came to Edinburgh is also somewhat shrouded in mystery. The most reliable information that can be obtained shows that it was practised in 1830 by one Nicol, a teacher of writing in George-street, who produced some very fine specimens of writing in it, such as circulars, bill headings, etc., and is said to have produced by the aid of lithography the first copy lines for schools, which were published by one Swan, and called "Swan's copies." It was then taken up by some amateur artists in Edinburgh Art Academy, and in the print room of the British Museum is a drawing

in chalk by Horatio McCullock, who flourished at that time as one of the first landscape painters in Scotland. Beyond this nothing of a very high artistic character was attempted, but it was then used in the transferring process by several of the so-called engravers and printers as before explained; and notably one W. H. Lizzars, who was a large publisher of illustrated works as well as an engraver and printer. He published a book on natural history, largely illustrated by engravings both in wood and plate. His work extended to several volumes, and lasted for a number of years. All the plates were engraved and coloured by hand. He also published some large works on surgery for his brother, Professor Lizzars, as well as some works on other sciences, and his establishment in James'-square was one of the largest of its kind in Scotland, employing numerous hands both in printing the plates and colouring, most of which was done by females. The new art of lithography, however, altered all this, and changed the position of this firm; for out of the new art sprang new ideas, new methods, and new and enterprising firms, which have made the name of Edinburgh for illustrative publications known throughout the length and breadth of the land. But of the early, and to our history the more important, pioneers in Edinburgh was one Samuel Leith, who began to practice the new art as early as 1830. He was born at Banff, in the north of Scotland, and in his early life went to Jamaica, where he was engaged as an overseer on a sugar plantation. Returning to his native city he started business as an engraver and printer, but not finding scope for his decidedly great abilites, he came to Edinburgh and started as a lithographer. Nicol used to do his writing, and Leith did Nicol's printing. He also employed some of the Scotch artists to draw on stone for him, as he was no artist himself, but a man of considerable taste and ability; and the product of these, he printed and published as he got them up. Not being content with such assistance as he could find in Edinburgh, he brought from Stuttgart two skilled workmen to help him; one was Fredk. Schenck, an artist and engraver on stone, the other was Z. Wallher, a lithographic printer; and with these additions to his establishment Leith soon founded a large business and began to publish many valuable and important artistic works, as well as to execute some beautiful commercial work in engraved lithography. At this time no such class of work was executed elsewhere in Scotland, or indeed anywhere out of Stuttgart. Mr. Wallher afterwards went to London and founded a business there, known as that of Wallher & Co., and Mr. Schenck succeeded Mr. Leith in the business, which he carried on for some time, and then was joined by Mr. McFarlane, when it became the firm of Schenck & McFarlane. Mr. Schenck was not only an engraver on stone, but a man of first-class artistic taste, and it is singular here to notice that the art of engraving on stone (a most beautiful art) lived and died with him here. Nothing of the kind is now practised in Edinburgh, though some fine specimens of it are still to be seen, and one in particular may be instanced, that of the Lord's Prayer, in an ornamental border, which was designed by one of the name of Kronheim, of Miller & Richard's, the typefounders, who was a countryman of Schenck's, but who afterwards went to London and founded the firm of Kronheim & Co. Mr. Schenck, as we have said, was a man of high artistic taste, and published some of the finest chalk portraiture of the art in his day. He brought over and employed several of his countrymen for this work, besides forming a kind of school of his own out of the material at his command, and several of his pupils became artists of some celebrity. The work published by Schenck & McFarlane, both in chalk and colour work, was equal to anything published at the time, and particularly that of their portraiture, which consisted of most of the Scotch divines and celebrities of the day, so that their name became known wherever the art of lithography was appreciated.

New Use for Carbolic Acid.

OWING to the wonderful and almost exceptional penetrating qualities of carbolic acid a new use has been found for it which cannot fail to find numerous followers. It is too often the case that machine inking rollers get neglected, and the ink becomes caked upon them in a hard layer, which destroys their usefulness at once. There are many remedies at present known by which this can be cured, but even these are often quite ineffectual in obtaining the desired result, and, moreover, do not succeed in so clearing the nap of the leather as to give back to the rollers their original elasticity and inking power. Here is where carbolic acid comes in as the effectual cleanser.

In the use of this acid a large amount of care must be exercised. In the first place, carbolic acid added to turpentine will very often be sufficiently powerful to thoroughly revive the rollers. If this fail, then a direct application of carbolic acid will be necessary, and will accomplish the purpose. But on the point of this application of the carbolic acid there is just a word of caution to be added. Carbolic acid is a deadly poison, and has a burning effect. If the finger is put on the mouth of the bottle and the acid shaken up, it will whiten the skin. This whitening is a temporary deadening of the skin, and will remain until in the ordinary course that part of the skin is worn off. The more delicate the skin the more will this effect be seen. In an instance of using this acid for cleansing a roller the carbolic acid was put on with the bare hand, and in the operation, wherever the acid touched the skin it had a paralysing effect. Of course the effect was only temporary, but at the time gave cause for considerable alarm. To obviate this, however, the acid can be used in a shallow tin vessel, long enough to take the roller. In the bottom of the vessel the carbolic acid solution can be poured, and the roller turned round in it until the whole skin has been well dipped. This will loosen the hardened cake of ink, and on washing it well with turpentine in the usual way and scraping the roller, should be ready for use. Previous to dipping the roller in the acid it should be well washed with turpentine.

Lithographic Technical Education in France.

PART III.—THE ARTIST.

THE real technical education of our chromo artists appears to be almost entirely neglected, and as a matter of fact there are few, if any, pupils in the true sense of the word in the Parisian chromo houses. The result of this is seen in the undoubted fact that on the completion of the usual term of apprenticeship the majority of them are quite unable to take any other position than that of ordinary workers, and of those who may be found better equipped than their fellows, it may be ascribed to more than average ability coupled with a more than usual amount of energy and perseverance. In these large houses the employers are usually too occupied with more direct pecuniary matters to be able to spend much time in the tuition of their beginners. Here the artists are under the supervision of a foreman-artist, who receives a salary of from 7/- to 10/- per day, and is responsible for the output, which is invariably from the combined work of a number of the workers in that department. I say the "combined" work advisedly, for this is a necessity on account of the inefficient results obtained from the lax system of apprenticeship, and if almost any large chromo-lithographic establishment be instanced, it will be found that beginners have no opportunity of acquiring a good all-round knowledge of the art, and while they are kept usually to one branch of work they are not taught even that thoroughly. This arises partly from the fact that they are found useful for the performance of little details and portions of work here and there, and more especially routine work, and are set to do this in place of learning a branch perfectly. This results in their being found of use for a time, and after some varied experiences of fragmentary work they settle down to the ordinary fixed style of the house, seeing and learning nothing beyond their own portion of the establishment, and only a mere fraction of that. There is little or no opportunity for them to rise in a special branch of work, and on the completion of their term of apprenticeship they, as frequently as not, remain in the service of the same house, very often incompetent and lacking in knowledge and experience of the best elementary work. The really good men almost invariably form offices of their own, and execute work independently of any special house, and work at prices varying according to the class of work they do.

When the office is fortunate enough to receive much encouragement, assistants are obtained from among artists of similar ability, and these receive remuneration at the rate of from 5/- to 10/- per day. To take an example among the artists of Paris: one of them has an establishment presided over by a foreman who is paid at the rate of 12/6 daily. In this instance the chief merely makes a rough draft of a subject required and hands it over to the foreman, who elaborates it and in turn hands it to subordinates who have special capabilities for special kinds of work and are employed almost entirely on that speciality.

It is from such establishments as this that the best artists usually originate, for as a rule the apprentice who has energy and a desire to learn has much better opportunities to learn and to succeed than one in a large litho establishment. Immediately they complete their apprenticeship these receive from 5/- to 6/- per day, and it is to the immediate interest of the employer to assist them, for often in their fourth year of apprenticeship they can replace a man at general work. This, of course, is different in the large houses, where it is to the personal interest of the employer to leave the beginner at some sub-division of the work, and to keep him there merely in the interest of the house.

I cannot altogether deplore that this state of affairs is becoming so general in French houses, in spite of its being prejudicial to lithography in France, for the consequence will be at no distant date that the question of a proper and full apprenticeship for the young litho-artist will come to the front, the agreement being now usually made in the interest of the employer and seldom fully considering the ultimate good of the young men.

Another reason which causes me to fear somewhat for the future of lithography in France is the scarcity of capable machine managers who can give the necessary oversight to all the details of working. The large establishments receive comparatively few apprentices to lithography, and if a vacancy occurs in the staff it is immediately filled by someone lower on the staff who may merely have been previously employed on the simplest routine work. These young fellows, who for some years have probably worked among the machines, sometimes develop into good workmen, but unfortunately this is by no means the rule. They are thus compelled to essay the production with little, if any, personal experience, and if they are not constantly under the eye of a capable employer, will almost of necessity produce work which will not go to enhance the standing of the house and the enlargement of its receipts.

It is a fact well known among lithographers that the greater part of the good workmen of the metropolis have come from the provinces, where they have undergone an apprenticeship and obtained a knowledge of the work needful, with perhaps the exception of the specialities and the advantage of being employed on superior work.

The duration of the apprenticeship varies from two to three years according to the contract, and it is almost always remunerated, not highly it is true, at the following rates: 7½d. per day for the first year of apprenticeship, 10d. for the second year, and 1/- or 1/3 per day for the third year.

Apprentices in the provinces always receive instruction more technical in character than is given in the

Lady Charlotte Duncombe.

From "Bygone Beauties,"

Published by the Leadenhall Press, London, E.C.

DE MONTFORT PRESS.

capital, where a beginner spends a certain amount of time at the hand-press, thus going through some sort of a course. Of course I am speaking of the generality of the houses of the capital, and as there are exceptions to all rules, some of the offices are not to be condemned in this respect.

What I should like to see in each house having apprentices, is a fully competent manager or other responsible person, whose duty it is to give or see that instruction is given to the apprentices of sufficient value and thoroughness to enable them to gain a practical insight into the business. Unfortunately this is not often to be found, and the young fellows usually have no further care than how to get their work done in the fashion most pleasant and convenient to themselves. I believe, however, that the root of the want of interest and the want of proper knowledge must be laid at the door of the employers, who themselves are the most ready to complain of the scarcity and the incompetence of employés.

A. VALETTE.

ON a supplement in this issue we reprint (from blocks kindly lent by the publishers) a specimen portrait from "Bygone Beauties; a select series of Ten Portraits of Ladies of Rank and Fashion," from paintings by John Hoppner, R.A., engraved by Charles Wilkin and annotated by Andrew W. Tuer (The Leadenhall Press, E.C.) The portraits form one of the very best series of copper-etchings applied to typographic printing that has ever come under our notice, especially in their fidelity in light and shade to the originals, and with the tasteful disposition of the text forms a quaint booklet, neatly bound in dark-blue with gilt lettering, and tied with ribbon. The portraits are excellently printed on India tint; and the accompanying text, explanatory of the pictures, is set out in tastefully effective style. The novel and dainty manner in which the work is produced does the publishers great credit and shows that they are bestirring themselves to keep up with the progress in fine printing.

AT the recent bazaar in Bristol the extensive canvasses required in building up the old street of Bristol, covering some 1,600 square yards, were designed and painted by Mr. A. Handcock, a lithographic artist. The interior is thus broken into eleven houses and shops, and a central market cross. The Bristol papers speak very highly of the whole production, and prophesied that the bazaar would from this cause be one of the most popular ever held there. Mr. Handcock's drawings of Old Bristol have been etched by Mr. Charles Bird, and have become very popular.

HERR JOSEF RINGLER, of Augsburg, one of the oldest and best known lithographers in Germany, died recently. He served his apprenticeship under Senefelder, and for many years had been considered an authority on all matters relating to lithography, especially in that branch termed oleography, which became his particular study. Since 1843 Herr Ringler had been the proprietor of a printing establishment in Augsburg, which had gained many medals and distinctions for the excellent quality of its work.

Obtaining Prints to Scale at the Ordnance Survey Office.

THE large-scale maps of the Ordnance Survey are printed on double elephant machine-made drawing paper, the expansion of which, due to humidity, is greatest in its length. Being a hard paper, it is necessary to print from the zinc plate on damp sheets, which contract on drying, in length chiefly. Consequently, the form on the plate should have a similar elongation.

The negative is taken true to scale, and a photographic transfer prepared, after the Southampton method, on Evans' double elephant thin paper, which likewise has its greatest expansion in length. Previous to transfer to zinc, the transfer is damped until it has expanded to a certain convenient length—in practice, about a quarter of an inch beyond its correct size—and quickly passed through the zincographic press; the scraping action of the press increases the length of the transfer by a slight variable amount, which can be determined by experiment. The printer then obtains a stock of paper for printing that has been damped to such a degree of expansion as will contract on drying to the correct scale.

In the paper-damping department a stock of printing paper is kept sorted in various degrees of expansion to suit the variable sizes of form on the zinc plates. Every sheet of paper used for printing is measured before being damped, after being damped, and again after being printed. Prints with over $\frac{1}{600}$ or ·16 per cent. of error in scale are cancelled.

It is found that the elasticity of paper, *i.e.*, its capability of regaining its original form on drying after being damped, depends on its maturity, and that the maturity of a sheet depends on its age, and to a certain extent on its position in the ream.

Correspondence.

To the Editor of THE BRITISH LITHOGRAPHER.

SIR,—In reference to your question in Advanced Lithography, No. 10, I may state I have used the patent litho zinc plates made in Hull with excellent results for photo-lithography by the photo-transfer methods, also for the direct photo-printing method (not the albumen process), but by an improved method of bitumen and resin, which gives a cleaner and sharper image and holds firmly to the plates. I have also succeeded in producing some fairly good tone and grain pictures from drawings in wash and photographs, of which I enclose you a rough sample. I think there is a good place for these plates in the immediate future, as they are so much easier to handle than the litho stones.

Yours truly,

E. FREWING.

Kingston-on-Thames.

[The specimens sent by Mr. Frewing are certainly very interesting productions and point to extended usefulness for zinc plates.—ED. B.L.]

Book Notes.

ONE of the latest additions to the literature of "Photo-Engraving" reaches us from St. Louis, U.S.A. We have had the pleasure of studying many practical treatises, both in science and technology, but for minute details we have not seen anything to equal this work by Carl Schraubstader, junr. From a close perusal of the work, we feel assured that almost any amateur who carefully studies it will feel the fullest confidence in undertaking the most difficult zinc-engraving after comparatively short practice. Much of the information seems to be based upon the practice of a well-equipped establishment wholly devoted to photo-engraving; and although many mechanical appliances are described and their measurements given, yet there is plenty of room left for the individual discretion to be used on such matters.

BY the same author as "Photo-Engraving," just noticed, is a small book entitled "Copy for Photo-Engraving." On such a subject it is impossible to expect very much, and in the little pamphlet of twenty-one pages, the reader will find all that is necessary to enable a draughtsman to execute sketches which shall contain all the requisite qualifications for "copy."

THE near publication is announced of "London City Suburbs" (London: The Leadenhall Press, Limited), a companion volume to the recently issued and sumptuous "London City." The book promises to be a rare treat for the bibliographer, and more especially for the lovers of fine books, for the character of the work lately issued and the reputation of the Leadenhall Press will ensure that nothing will be omitted to make it perfect in all the details of illustration, printing, binding, paper, and general get up. There are to be over three hundred beautifully engraved illustrations, many of them full-page, from original drawings. The published price will be 42/-, and the price to subscribers 21/-, if paid in advance. At the present time the great area of residential London stretches away on all sides from the city proper until it finds itself merged into the field and forest of half-a-dozen counties. At first the houses close up into rows, where nature has to be tempted into flower boxes and trapped into conservatories. But even Belgravia and Tyburnia get at least glimpses of spacious parks; and beyond these and the other headquarters of crowded fashion we reach regions which, like their houses, are semi-detached. London relapses into lawns and tennis nets. It is "villa-dom," but it is also "laburnum-land." Further afield red tile and brick gleam amidst greenery, and roses and honeysuckle clamber over porches. To fittingly describe this is to be the work of Mr. Percy Fitzgerald, who will tell the tale of the places which Mr. Luker illustrates. More about the book later on.

THE Campbell Printing Press Co. have favoured us with one of their illustrated catalogues of lithographic and letterpress machines. A perusal of it gives one a good idea of American machinery.

THE *Magazine of Art* for April presents to its subscribers one of those gems of photo-mechanical printing which so nearly approach the original, except in colour. The subject is Alma Tadema's picture, "The Old Story," and consists of the two figures of Othello and Desdemona, seated on a luxurious marble exterior, typical of the country wherein the scene is laid. The work is produced in photogravure by permission of the Berlin Photographic Society. In the same number are biographies and works of Stanhope A. Forbes, A.R.A., and Sir George Reid, P.R.S.A. The May number has an etching by F. Krostewitz, after the picture by A. Schreyer, depicting a scene "On the road in Wallachia." All that can be said of this work is that it seems to be a fairly good copy of the picture, except that the atmospheric effect seems lost, which gives the whole an unpleasant monotony. The picture itself tells its own story of the wretchedly poor means of transit and the equally bad condition of the roads in that country. The remainder of the number is singularly lacking in interest, unless anything can be derived from the illustrations of beautiful ceilings in various old and new mansions.

THE *Art Amateur* is again full of useful matter for the student of anatomy and American colour printing. In the April number are many remarkably good figure sketches from Hubert Herkomer's (R.A.) sketch book, and after Edouard Detaille. There are also two good copies of water-colour sketches by Hubert Herkomer, R.A., and another study of a horse's head. The May number contains some illustrations from lithographs of Raffet's pictures. Anatomy is again prominent both in Raffet's pictures and in the designs for large capitals, and fan decoration by Mrs. M. Sargant Florence. The large sheets of designs include some good musical emblems from Louis XV. and XVI. decoration, and many useful sprays, flowers, borders, and birds. There are two coloured plates (American lithographs) with the May number. One of them is after the picture by G. H. Spiers, "A Quiet Smoke," and it is a remarkable example of printing a deeply coloured subject, without leaving the faintest trace of a gloss upon the finished print. The other plate is a pretty sketch of swallows in flight, by Helena Maguire. It is highly finished, and as a study is of considerable value.

THE *Art Journal* for April contains a tasty etching by Mr. C. O. Murray, after the picture by Mr. J. R. Weguelin, entitled "Spring." The continued articles on "Outings in India," and "Paris Pleasure Resorts," are again very good. In the May number is an original etching of a lion's head, by Mr. H. Dicksee. It is full of vigour, and has a very natural effect. This number contains some illustrations from David Murray's picture, and from some interesting selections from the late Mr. F. Leyland's collection.

OWING to circumstances beyond our control, we have been compelled to leave over the initial chapter of Mr. Paton's papers on "Etching" till next issue, when we hope to have an illustration ready.

Notes and Queries.

[*Through this channel anyone submitting a question upon printing or allied processes can receive an answer, either from our staff of practical technical writers secured for this Journal, or from some reader who may be better qualified to answer "special" questions.*]

In reply to "Anxious to Learn," we have very little doubt as to the real cause of your difficulty lying in the ink. The ink is one which will not work well under the best of circumstances. It is alkaline in its action, and just the same as ammonia and caustic soda (both alkalies) are antagonistic to grease, so does this blue gradually wear out the work from the stone. As to a remedy, under such circumstances it is very difficult to say. But we think that if you grind the ink into Fleming's oil, instead of varnish, you may have greater success.

In reply to "A Subscriber," we refer you first to our article on "Bronzing and Dusting" in No. 3, pp. 18-20, and secondly to a short note in the present issue on "Silicate of Potash." The foundation of your difficulty is in the ink not adhering to the board. Your ink is not soft enough. The addition of any volatile oil—oil of cloves, etc.—will soften it and assist it to go into the enamel. If that should fail, then add small quantities of flour paste to the ink you now use, until a proper adhesion is obtained.

In reply to "Litho Apprentice," we can assure him that oriental blue is one of those inks which is very difficult to manage either alone or in mixtures. Its chemical nature is averse to grease, and has a tendency to destroy the work on the stone. The only recommendation which can be given, backed up by experience, is to grind it into Fleming's oil (Edinboro') and again try to obtain more satisfactory results.

Messrs. Melven Brothers ask us where to obtain good impressions from copper or steel-ruled plates. We suggest that Messrs. Bacon, of London, are the most likely.

In reply to Mr. E. King (of Stockwell, S.W.), who asks for information as to the purchase of half-tone crossline screens, we are able to state definitely that the only maker at present known in the whole profession is M. Wolfe, 106 S. Main-street, Dayton, Ohio, U.S.A., and his prices vary from :—

$20	for a plate	8-in. × 10-in.	with	80	lines to the inch.
$20	,,	8-in. × 10-in.	,,	124	,,
$30	,,	10-in. × 12-in.	,,	124	,,
$50	,,	13-in. × 13-in.	,,	124	,,
$70	,,	14-in. × 14-in.	,,	124	,,
$30	,,	8-in. × 10-in.	,,	132	,,
$50	,,	10-in. × 12-in.	,,	132	,,
$70	,,	13-in. × 13-in.	,,	132	,,

We give directions for making these plates in our article on "Photo-Mechanical Printing Processes" in the present issue.

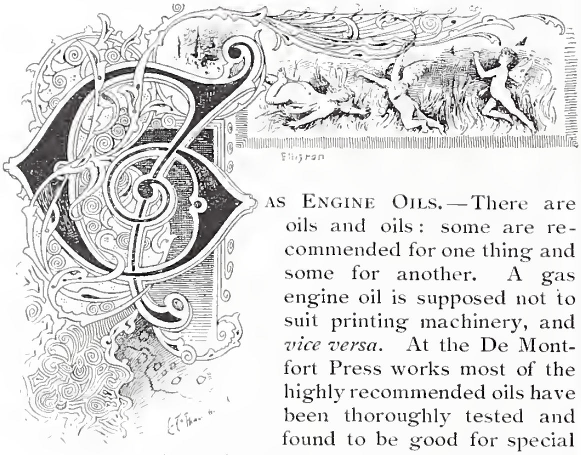
In the first number of our next volume the Questions set at the recent City and Guilds of London Institute Examinations will be worked out.

About Tracing Papers.

The best tracing paper for lithographic purposes is raw hemp or flax paper, made of hemp or flax that has not undergone putrefaction, for its transparency is due to the gluten contained in the fibre, which is destroyed by putrefaction. This paper is not glued, because the purity of the gluten renders this unnecessary. In manufacturing this paper, great care must be observed; rough fibres appear later as white spots, which are not transparent. Many of the tracing papers now in the market are brittle, and lose their transparency after a while. Tracing linen is more durable, but does not take the ink well, and this defect we find in some tracing papers also. Another fault is that the more transparent these linens or papers are, the less distinct do the lines of the drawings appear. These are the principal defects of most tracing papers and linens. To overcome them a method has been found by a French designer named Delaurier, who, so far, is very little known. Instead of saturating a sheet of fine note paper with oil and using it after it has been dried, the paper is saturated with some volatile oil; for instance, spirits of turpentine. It is perfectly easy to work upon such paper with the pencil, provided that no trace of the turpentine remains, that the paper is thoroughly clean, and that it retains its original whiteness after it has dried. Such paper takes the ink as well as the pencil. If the flavour of turpentine is repugnant to the designer, he may use any other volatile oil—petroleum, benzine, or sweet-scented essential oils: it is only to be observed that the paper does not lose its original whiteness during the process. Alcohol makes the paper also transparent, but it evaporates too rapidly, and its use is for this reason not to be recommended. A remarkable fact is that ordinary brandy, containing one-third alcohol and two-thirds water, makes glued paper just as transparent as pure alcohol, and is said to possess the advantage of not evaporating as rapidly. By using this method, tracings are obtained upon paper which appears white and untransparent after the work has been completed. Tracing upon the window pane is fatiguing and inconvenient, and the fine lines do not appear distinct. M. Delaurier has tried to ascertain the cause of the fact that ordinary paper can be made transparent by means of microscopal investigations. He has found that the fluid permeating the paper opens the fibre. Even after paper appears thoroughly dry some moisture is retained in the fibres, and this is especially the case with oiled paper. The oil effects a certain kind of repulsion, which allows the light to shine through the liquid that has separated the fibrous matter from the cellulose.—*Imprimerie.*

A society for engravers on wood has resulted from the movement initiated by Messrs. Lacour and Drummond, but whether it will assist in elevating the art remains to be seen. According to a notice issued by the secretary, the office of the society is to be found at the "Mitre," in Chancery-lane, and Professor Herkomer figures as president.

Trade Notes.



Gas Engine Oils.—There are oils and oils: some are recommended for one thing and some for another. A gas engine oil is supposed not to suit printing machinery, and *vice versa*. At the De Montfort Press works most of the highly recommended oils have been thoroughly tested and found to be good for special purposes. Latterly an endeavour has been made to find *one* oil that should answer equally well not only for gas engines, but for all the machinery, large and small, usually found in an extensive printing, stationery, and binding business. This we have found in the gas engine oil supplied by Messrs. Greaves & Mason, of Southbrooke-road works, Lee, S.E., which has been thoroughly tested in our works for the last eighteen months, and found to be thoroughly satisfactory in every respect. Previous to its adoption there were constant complaints as to the uncertain and unreliable qualities of the oils in use, but since the adoption of Messrs. Greaves & Mason's oil there has not been a single complaint. The quality is "always up to the standard," it always works freely and clean, without waste or the least "gumming," no matter how fine may be the mechanism it is used to lubricate, whilst the price compares favourably with others in the market. We learn that the sales have trebled each year since first introduced, and the export business has been greatly stimulated by the fact that the oil is not affected by quick changes of climate.

Mr. Alex. Gascoine, whose announcement appears on another page, has submitted to our notice a variety of specimens of his work in wood engraving and photo-etching in "half-tone" and "line" work, which prove him to be thorough master of both classes of graphic reproduction. His work is invariably bright and artistic, his plates deep and clear and possessing good printing qualities, whilst his charges compare favourably with others in the same line. Mr. Gascoine is full of ideas and lays himself out to assist publishers and pictorial advertisers with sketches and designs on any subject.

Our employing subscribers will be interested in the announcement of McCaw, Stevenson & Orr, Limited, on another page. This announcement is the direct outcome of the numerous enquiries we have from time to time received for information where showcard mounting and varnishing could be well and expeditiously done. McCaw, Stevenson & Orr, Limited, have for some years past laid themselves out specially for this class of work, and though it may at first sight seem a long and expensive journey to send work to Belfast, in reality it is not so, as the rates for carriage are very low, and the work—as we can testify from specimens in our possession—is done in a finished style such as we have seldom seen equalled. The most scrupulous care is taken to use none but the very best materials, and the staff employed have had extensive experience of the work. The announcement that specimens for submitting to customers may be had free of charge and parcels may be sent "carriage forward" shows that the Company are confident of giving satisfaction.

Our next issue, being the last number of the first volume, will contain the title-page and index, and, as a frontispiece, a new portrait, never before published, of Alois Senefelder, the father of the art. The portrait will be printed in photo tint on plate paper, and will be suitable for framing.

PRINTED WITH A. B. FLEMING & CO.'S LITHOGRAPHIC INK.

BRONZE BLUE, LAB. NO. 139XL, AT 8/- PER LB.

&C.R. Ltd.

THE BRITISH LITHOGRAPHER

A JOURNAL FOR LITHOGRAPHERS · ARTISTS · DRAUGHTSMEN · PHOTOTYPERS · STEEL & COPPER-PLATE · ENGRAVERS &c.

SAXA LOQUUNTUR

VOL. I.—No. 6. AUGUST–SEPTEMBER, 1892. PRICE EIGHTPENCE.

CONTENTS.

INDEX TO MANUFACTURERS.

ISSUED EVERY OTHER MONTH, ABOUT THE END OF SEPTEMBER, NOVEMBER, JANUARY, MARCH, MAY, AND JULY.
SIX NUMBERS FOR 4/- YEARLY.

Our First Volume is Completed

WITH this number, and our heartiest thanks are due to the lithographers of the United Kingdom for the splendid support they have given us in subscriptions and in complimentary letters and suggestions for its improvement.

Looking through the numbers as issued, we are satisfied that we have done all we promised in our opening address, but not all we intended doing.

The need for a lithographic branch to our business began to force itself on our attention immediately after the issue of the first number of THE BRITISH LITHOGRAPHER, in order that lithographed supplements might be given regularly, and especially when, as happened several times, supplements from outside firms failed to put in an appearance to time.

This difficulty is now overcome: our litho department is at work, and we promise that not only lithographic supplements, but examples of collotype, and other processes allied to lithography, will find place in the next volume.

We want to make THE BRITISH LITHOGRAPHER the art journal of the craft and in every way worthy of preservation. The support so far has been most gratifying and full of encouragement for us to persevere in the path we have marked out.

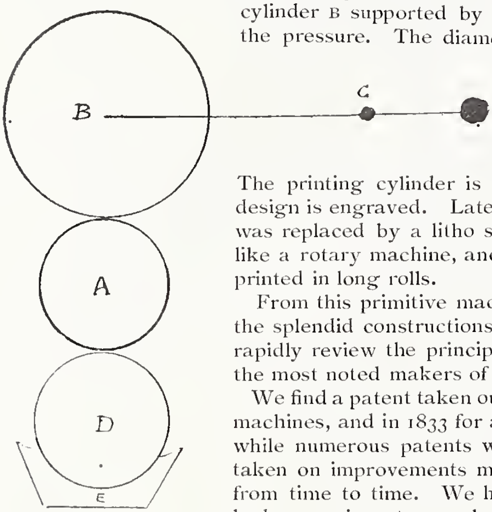
We have, in the brief space of one year, secured the front place in the ranks of lithographic technical journals, and we mean to keep it. Our readers can help us to make THE BRITISH LITHOGRAPHER still more of a success by making it known amongst their friends, and securing new subscribers. The more subs. we get the more we can do to make the B.L. indispensable to the craft.

An inspection of this number will give some idea of what may be looked for in the future. *We* think that the chromo title-page for the first volume, which we present in this number, is both artistic and well-printed, and we invite our readers to guess how it was produced and describe the process. Five shillings will be given for the most correct description.

Lithographic Printing Machinery in France.

By A. Valette.

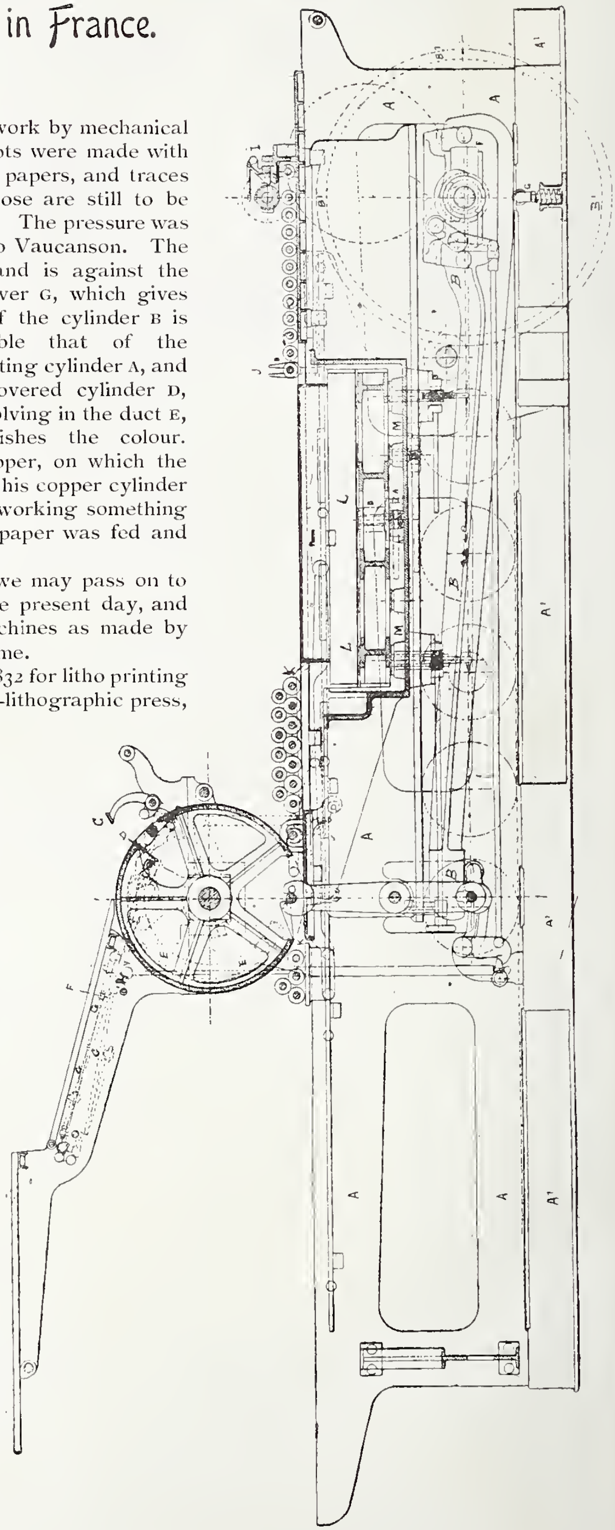
The first attempts at printing lithographic work by mechanical methods date from 1826. These attempts were made with the direct object in view of printing wall papers, and traces of a machine constructed for this purpose are still to be found; the appended sketch shows the general design. The pressure was exerted by means of levers by a method imputed to Vaucanson. The printing cylinder A is fixed, and is against the cylinder B supported by the lever G, which gives the pressure. The diameter of the cylinder B is double that of the printing cylinder A, and a covered cylinder D, revolving in the duct E, furnishes the colour.



The printing cylinder is of copper, on which the design is engraved. Later on, this copper cylinder was replaced by a litho stone, working something like a rotary machine, and the paper was fed and printed in long rolls.

From this primitive machine we may pass on to the splendid constructions of the present day, and rapidly review the principal machines as made by the most noted makers of our time.

We find a patent taken out in 1832 for litho printing machines, and in 1833 for a typo-lithographic press, while numerous patents were taken on improvements made from time to time. We have had occasion to work on various models of these early machines, amongst them on a "Courtet" machine, which had a most simple construction; the carriage was drawn down past the cylinder by a cogged semi-circular wheel. In another machine we have had experience with, and of which the patent was taken out in 1873 by M. Huguet, a toothed pinion revolved on an eccentric or cam motion, giving the closing-up movement to the carriage, which was supported by several rollers of eighteen to twenty centimeters in diameter, the pressure being given by the aid of a counterpoise placed at the extremity of a long iron bar, which was fixed to a fulcrum or swing movement attached to a transverse bar; the pressure bar itself was fixed to two uprights, the upper extremities holding the pressure bar down upon the cylinder, and thus exercising a direct pressure on the cylinder throughout the whole time of movement. This kind of pressure, though primitive, had one good quality which has often been omitted in machines of the present day. Perhaps it was not very elegant, but a very strong impression was obtained, and, more important still, it was very elastic. It is this elasticity that I regret the absence of in machines of the present time. In many of the machines in use, the practice of printing with dry paper gives equal weight of impression throughout, owing to the absence of lever pressure. This same class of machine presented undeniable advantages in solidity, regularity of the movement of all parts, good impression, and



reliable inking power. The inking arrangements appeared to receive the special care of the makers, and I would like to see the machines now in use as capable in this direction as the old Huguet machines. These machines were furnished with leather-covered rollers, held down by springs fastened to the side of the machine, though the charging with ink was somewhat different to the method now generally adopted.

The accompanying sketch illustrates one of the last models constructed by one of the oldest and most important French houses of litho machine builders, the firm of Marinoni. Great solidity, easy working, and perfect action are claimed for this machine. In the structure, the sides A are very strongly put together, and firmly fixed on the base A^1, which also carries the supports of the beam B, and of the wheel actuating the carriage, so that it carries the pulleys and the moving power B^1, thus avoiding the many difficulties met with in fitting the machine together. The press is furnished with self-delivering apparatus G, regulated by a cam fixed on the shaft. The movements of the carrier and that of the handle at D regulating the speed of the cam. As to the manner of obtaining a good, clean register hole, indispensable for obtaining a good printed copy of the original, and to allow the points to be ready for the following impressions, the sheet receives a kind of lifting motion to avoid enlarging the hole made by the pins, but not allowing the points to be entirely withdrawn from the register holes, so as to avoid moving the sheets out of register before being carried round by the grippers. The projection of each of these points before the cylinder D may be varied at will, they are each moved by a special finger-bar, which is made to easily allow a change from the worn-out holes. The points behind the cylinder E are adjusted from the under side. I may perhaps be permitted to give some hints on the mode of practically setting the points from the under side. After the first pull taken as a trial sheet for register, pass the point up through the hole cut to receive it, and take note that this point exactly pierces the paper in the place it is intended to; if it does not, then alter it by forcing the point a little in the required direction, marking its place lightly on the stone, then drawing the machine back, and making the hole on the stone on the place marked, being careful to avoid any scaling which may be produced by the needle or by the paper at the first impression. The points on the feeding board F, which are most carefully constructed, are fixed on the lines G and are placed parallel with one another. In order to assist with the adjusting of the points on the feeding board, the sides and the supports themselves are furnished with screws, which allow of their being moved and set without tearing the sheets. The setting of the points is effected by the aid of a screw travelling in a parallel direction to the axis of the cylinder and the supports of the points, and carrying an arm which extends up the feeding table, also carrying a thumb-screw. When the point has been set at one side, the arm is pushed across the feeding board along the transverse bar, and the point on the other side is set to the gauge of the thumb-screw on the arm, thus bringing the points perfectly parallel.

[To be continued.]

City and Guilds of London Institute Technological Examinations.

The number of students who sat for examination in the technology of lithography shews this year a large increase on former sessions. Three new classes—Derby, Leicester, and Liverpool—were added to the two previously in existence, and they have all done well, Leicester especially so. The success of the Derby and Leicester classes is very creditable to all concerned, and must be gratifying to the able instructor of both classes, Mr. S. D. Hall, of Derby. Manchester holds its own well. London has a tough job to keep up its numbers, by reason of the long distance the class-room is situated from the centre of the industry in the city. Liverpool is improving, and will no doubt do better now that the teacher has taken his first-class certificate. We are very pleased to see this awakening amongst the lithographic craft, and hope to see even better results next year. The great want seems to be thoroughly practical teachers, and next, class-rooms so situated as to be easy of access after the regular working hours.

RESULTS OF THE EXAMINATION HELD IN LITHOGRAPHY, APRIL 30th, 1892.

DERBY.

ORDINARY—

W. T. Cocker, ... 1st class.
(Institute's 3rd prize Bronze Medal.)

H. W. Ashman	1st class.	W. S. Fraser	2nd class.
W. B. Ridgard	2nd ,,	J. H. Graves	2nd ,,

Seven students sat for examination; five of them passed, two 1st class certificates and three 2nd.

LEICESTER.

HONOURS—

C. W. Kilby .. .. 1st class.
(The only Silver Medal and Pewterer Co.'s prize £2.)

J. R. Ellwood .. .. 1st class.

ORDINARY—

Robert E. Walton .. .. 1st class.
(2nd prize Bronze Medal and Pewterer Co.'s prize £1.)

Leigh H. Wallace	1st class.	C. E. Britcher	2nd class.
William Howard	1st ,,	J. Chapman	2nd ,,
William Stevens	1st ,,	Arthur E. Dilks	2nd ,,
Fred C. Shardlow	1st ,,	Albert Freeston	2nd ,,
Arthur C. Cheshire	1st ,,	— Goodman	2nd ,,
Arthur Hunsley	1st ,,	— Carr	2nd ,,
J. Watts	1st ,,	W. J. W. Pye	2nd ,,
Alf Cooke	2nd ,,	— Riddington	2nd ,,
W. E. Bott	2nd ,,	J. C. Smith	2nd ,,

Alf Woodcock .. .. 2nd class.

Twenty-seven sat for examination; twenty-two passed.

LIVERPOOL.

HONOURS—

John Honeyman .. .. 1st class.

ORDINARY—

Henry Wilkins	2nd class.	Samuel Sumners	2nd class.
James Bowen	2nd ,,	John Sinclair	2nd ,,
Walter J. Trill	2nd ,,	Harry Gomersall	2nd ,,

LONDON.

HONOURS—

G. Holland .. .. 1st class.

ORDINARY—

G. Baker	2nd class.	P. Holmes	2nd class.
H. Brough	2nd ,,	W. G. Pickering	2nd ,,

E. J. Shalcross .. .. 2nd class.

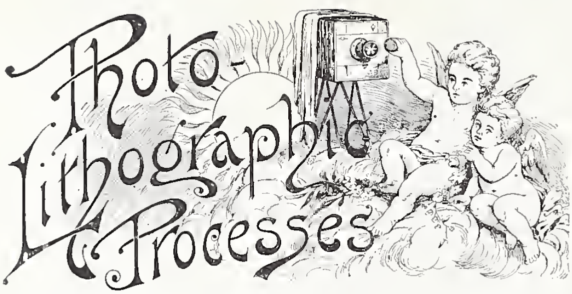
MANCHESTER.

HONOURS—

Arthur T. Moses .. .. 1st class.

ORDINARY—

Benjamin Shepherd	1st class.	John Hurst	2nd class.
Edwin Coups	2nd ,,	Frederick Nolan	2nd ,,
Frank Bowden	2nd ,,	Walter Reynolds	2nd ,,
Alfred T. Howartt	2nd ,,	John R. Wildeman	2nd ,,



CHAPTER VII.

Toovey's Negative Transfer Process.

In an exhaustive series of papers such as the present, it would be a mistake to omit any process, however clumsy or incomplete, which to the earnest student may be the means of opening up some unexplored channel of experiment. This process of Toovey's has very little to recommend it. It is one from which the best results cannot be expected, and it has certain drawbacks which the amateur cannot readily overcome. The process savours more of some of the older direct methods upon stone, and, like them, has its failings.

The transfer paper is prepared by coating a good smooth writing paper well, by floating it for five minutes upon a solution of :—

Finest picked gum arabic	5-oz.
Bichromate of potash	1-oz.
Water	15-oz.

Such a mixture contains just the bare ingredients to secure the hardening of the surface under the action of light, and the production of a photo print which under favourable circumstances might produce a picture. Later experience has proved the necessity of the use of a gelatine in the place of a gum, to give a more stable character to the film and allow it to be handled before finally transferring to stone, as already shewn in the previous chapters. But in this process by Toovey there is very little handling, and no inking of the transfer film. The paper, coated as above, must be dried in the dark room and kept there. When required it is put into the printing frame, and gradually the picture becomes hardened into the film by the exposure to light. It is now that the simplicity of the transfer film is brought into full play, and it will be at once evident that gelatine would be entirely out of place. After removing the print from the frame, it is not inked up, but is put directly upon stone or zinc. Upon the back of the transfer are placed several sheets of damp paper, and the transfer thus covered is put under hydraulic pressure. It may be difficult to obtain this pressure, but it is certain that any attempt to substitute the lithographic press with its drawing motion would cause a smashing and smearing of the gum composition. The pressure must be applied simultaneously, whether it be hydraulic or screw, as in a copying press, and it must be so powerful as to prevent the gum composition spreading when once damped. By this means the damp from the overlaid sheets is effectually pressed through the photo transfer and moistens the gum. The ready solubility of the gum enables it to become firmly adherent to the stone, and after a time the pressure can be removed. The damp sheets are taken off and the transfer paper carefully removed. The gum, which has become hardened by exposure to light, does not adhere to the stone, whilst the remainder, representing the whites of the picture, does adhere. The stone and gum are then allowed to become thoroughly dry, and finally a fluid lithographic writing ink, or transfer ink, or oil, is flowed over the stone. The gum, of course, keeps the stone clean, whilst the picture in the gum becomes filled in, thus giving the basis of a good lithographic drawing or transfer. The remaining process is simply a lithographic one, being only the drying of the stone, washing off the gum, and gradually working the picture up with the roller or rag, taking care to give it an occasional weak etch to keep it well open.

Such a process can be applied with certainty to line subjects, but for half-tone work—although it is quite expected to accomplish it—the chances of failure are too great to run the risk of waste of time.

[With the foregoing description it may be considered that all the known processes of photo-lithography have been described; but from time to time all improvements that are made will be fully recounted in this journal.]

Photography of Inks.

Dr. Jeserich claims it is possible to demonstrate differences in the colours of the inks which cannot be seen, the one appearing light and the other dark. This process depends on the following considerations :—

As is well known, the tints of the inks that are called black are either brown, red, green, or blue in shade. Such tones have but little effect on the eye, as it is chiefly sensitive to the yellow and red rays, but the chief sensitiveness of photographic plates, on the other hand, lies in the blue, violet, and ultra-violet. As, with ordinary sensitive plates, yellow and green subjects are rendered dark, and blue ones light, the same will follow in photographing inks of various tones. This difference can be considerably intensified by the use of suitably-coloured light and colour-sensitive plates. In this manner marked differences in the various inks can be clearly and distinctly demonstrated.

Among the subjects with which the author deals is the application of photography to the detection of the falsification of handwriting. In such cases photography can be of great service, as in an enlarged photographic picture erasures and alterations can be more clearly seen than in the original.

The British American Bank Note Co. have purchased, from Mr. G. B. Burland, the plant and goodwill of the Burland Lith. Co., of Toronto. A new staff of artists has been engaged, and the business will be put in first-class shape. The company will remain in the late quarters of the Burland Co., whose offices will be enlarged.

Louis Prang.

DE MONTFORT PRESS.

OUR PORTRAIT GALLERY.

Louis Prang, Boston, Mass., U.S.A.

AMONG the prominent lithographers to whose efforts and enterprise the art owes much of its present achievement, Louis Prang, head of the house of Louis Prang & Co., Boston, Mass., may be mentioned as one of the foremost. His father, L. Nicholas Prang, who was descended from an old Norman family that had found its way into Switzerland, had been brought up in Alsace as an engraver of blocks for calico-printing, and settling down in Silesia, became part owner and manager of a calico-printing establishment at Breslau. Louis was the second of six children, and, carefully trained under the eye of a thoughtful and wise parent, he became, in his eighteenth year, a master of the general principles of chemistry, and of bleaching, dyeing, designing, engraving, colour-mixing, and printing. Another year was spent in a commercial house at Westphalia, and, his father's interest obtaining him exemption from military service, he spent his nineteenth and twentieth years as chemist in a paper mill.

He had now become a skilled technologist, and his services were in demand. A wealthy Bohemian manufacturer sought him out and made him a proposition, by the terms of which he was to spend four years in visiting all the important manufacturing districts in Europe, acquainting himself with the best methods in every department of the calico-printing art, and afterwards organise and superintend a great factory in Bohemia. This was just the position that he had all along been working towards, and he gladly accepted the offer. Austria, Switzerland, France, England, and Scotland were in turn visited, and in each the young student-traveller sought out the most progressive establishments and accepted any position that offered: that of engraver, printer, colour-mixer, dyer, or common labourer, it mattered not what, so long as it gave him an opportunity to achieve his main object, which was to gain an insight into the organisation of the work and technical methods employed. During one year in France and another in England, he learned to speak their respective languages.

But the promised future was not to be, for while in Manchester the first news of the revolutionary uprising of 1848 reached him. His patriotism was fired, and hurrying home he became an active revolutionist. The movement was quickly suppressed, and after a short refuge in Bohemia he was compelled to retire to Switzerland, where, finding little probability of being able to carry out his favourite projects with any degree of spirit, or even with safety, he endeavoured to seek a wider field and sailed for the New World. Arriving in New York in April, 1850, he at once endeavoured to take up some work, and his experiences were both varied and trying. In company with a young architect, he took part in an attempt to publish a periodical dealing with ornamentation and monumental art; but after a year of hard work he was compelled to withdraw with a heavy debt on his shoulders. The time was not, however, entirely an unprofitable one, for from his partner he had learnt to draw on stone for lithographic work. An attempt as a manufacturer of fine morocco work and fancy boxes for jewellery, etc., was also unsuccessful, there being at the time no demand for a class of work which now supports hundreds of workers. After selling his share of the business for some $25, he began wood engraving, and although this art was perfectly new to him, he was confident of success. His marriage about this time also gave him greater incentive to pursue a lucrative means of livelihood, and he worked sixteen hours a day at his new profession. He succeeded so well that in five years he had paid off debts and accumulated a few hundred dollars as capital, though too close application to work had almost ruined his health.

In 1856, Mr. Prang formed a partnership with a lithographic printer, and in July of that year the new firm opened an office in a small room at 17 Doane-street, under the title of Prang & Meyer. Their speciality was to be colour work, and with one hand-press and a few stones by way of "plant," based on a capital of $250 in cash, they executed their first job—a bouquet of roses in four colours—for a ladies' magazine.

This colour-print is now of interest to lithographers as the result of one of the first crayon transfers ever made; and the various steps of progress illustrated by the constantly rising scale of the Prang productions from that time until the present, exhibit a most important service performed by Mr. Prang in the department of art and education.

The business at 17 Doane-street grew slowly but steadily. A removal of headquarters to the corner of Doane and Kilby-streets in time ensued; from thence to Merchants'-row, and again to 159 Washington-street; every removal representing a step forward and upward in the volume of transactions. While occupying the Merchants'-row quarters, Mr. Prang bought out his partner, and founded the new concern of L. Prang & Co., long since become familiarly known in every civilised country. About this time the civil war began, and the business so laboriously builded up came near a disastrous ending in consequence of that event. Nothing but the prompt and enterprising publication of war maps, portraits of generals, etc.—of which the sales were immense—prevented such a result. The development of the business kept pace with the growth of the country, and the publication of beautiful album cards—wild

flowers, autumn leaves, birds and butterflies, bits of sea-view and landscape—took place; these were soon universally admired and sought for.

In all the thought and experiment which he had thus far lavished on his art, Mr. Prang had carried in his mind a definite ideal, towards the realisation of which he had worked from the first. This was the production of chromo-lithographs, equal in execution to anything of the kind that the highest development of the art in Europe had ever brought forth. In 1864, he returned to Europe and looked over the whole lithographic field. The latest processes were examined, and a staff of artists, selected with special reference to their skill, was engaged. The next year two remarkable landscapes by Bricher, and a group of chickens by Tait, appeared, and were soon followed by others equally good, including the famous "Barefoot Boy," after Eastman Johnson. These faithful and beautiful copies of oil-paintings soon became famous as Prang's American chromos. This trade designation, adopted by Mr. Prang for his finest class of reproductions, created the word "chromo," now applied to nearly all colour-prints. Prang's chromos made speedily the tour of the world, and the newly-coined word found a recognised place in every language.

In 1867, the business had grown to such dimensions that an establishment designed especially for the requirements of chromo-lithography became a necessity, and a large building was erected in the Roxbury district of Boston, at 286 Roxbury-street. This building was partly destroyed by fire in September, 1877, entailing a loss of over $100,000; but with characteristic energy, new quarters were fitted up in an old abandoned brewery, and in a week the works were running day and night to meet all previous engagements for the holiday season just opening. The damaged building was repaired and enlarged, and occupied anew in March, 1878, but was soon found inadequate to the rapidly increasing business of the firm; and in the spring of 1881 additions were made to the workshops and machinery, which nearly doubled their space, facilities, and effectiveness.

From the commencement of his publishing career, Mr. Prang's powers, both as an energetic business man and originator in the path he had now determined upon, asserted themselves. Beginning with the laborious work at the hand-press and running through the various stages in the evolution of steam presses, he was enabled to produce his specialities of war maps, coloured album pictures, chromos, Christmas cards, etc., and his productions have invariably been produced with conscientious care and artistic ability. One of the earliest to practically demonstrate the use of zinc plates instead of stone, he was ever foremost in the march for improvement and novelty. A further development was the printing upon fine silk and satin surfaces, for banners, badges, etc. Facsimile printing of aquarelles followed, and the usual energy produced success even beyond expectation. Incidents of the civil war formed the subjects of some of his best productions, and these formed a fitting climax to the indefatigable endeavours in the direction of producing variety of colouring, quality of tone, and true artistic effects.

In 1874, the Prang firm took up the publication of a series of drawing-books for public schools, prepared by the late Professor Walter Smith, then State Director of Art Education in Massachusetts. These books were soon introduced into the leading schools of the country, and became the basis of an educational business of a very important character. In 1882, this educational business was separated from the business of the firm of L. Prang & Co., and a new concern, The Prang Educational Company, was formed for the prosecution of this special business. Of this company, Mr. Prang is president. This departure was in entire accord with Mr. Prang's whole desire during his struggle for the best and highest in the art, and under the fostering care which he and others have been enabled to give to the movement, the Prang System has become one of the most powerful levers in the development of art education in America.

One feature attests itself to the character of Mr. Prang and the vigour of his work; in whatever direction he has applied himself in his art work, he has been more than successful, and it is to his personal qualities of true discernment, great ability, and that true mixture of energy and talent that the name of Prang has become associated with lithographic productions of the best and highest class.

No one has ever doubted the live interest taken by Messrs. L. Prang & Co. in the arts of photography and lithography. Their fine art productions show the strictest devotion to the task of procuring the highest possible results in these branches of art. The Prang Co. have high aims and lately the solution of the problem of photographing in colour has occupied much of their attention. This has been the dream of almost every photographer, and experiments towards the realization of that dream have been made by scientists and amateurs wherever a camera has been known, but without success. There is, however, another practical step toward at least a partial realization of that dream, and that is to utilize the photographic negative for obtaining printing plates to be used in the press, which if printed in certain indicated colours, will reproduce the original painting or object as reflected by the glass of a mirror.

Such a process the Prang Co. have worked out, and specimens of their first two reproductions made with this process of original paintings, show how successful have been their efforts. These two pictures are truly an approximation to the "dream" of photographing in colour. They are reproductions of paintings by Alfred Miessner, one representing three winged cherubs' heads, the other a Madonna and Child, against the shadow of a cross. The success of the printing seems unquestionable; it is delicate and harmonious, and while this of course is due to the artist originally, the effect proves that the process is genuinely interesting.

Her Majesty the Queen and H.R.H. the Prince of Wales have accepted specially-bound copies of Mr. J. B. Marsh's new book, "St. Paul's Cross." The book is noticeable as having been printed and bound complete at the De Montfort Press, Leicester.

Lithographic Technical Teachers.

CHARLES HARRAP,

TECHNICAL LECTURER TO THE MANCHESTER LITHO CLASS.

OUR portrait this time is that of a notable craftsman, MR. CHARLES HARRAP, the teacher of Lithographic Printing at the Manchester Technical School. He was born in London on July 1st, 1860, and at the early age of ten was left an orphan. His education, which up to then had been at the public schools, including the Charter House, was continued at a high-class boarding school at Abingdon (Berks.), where, in 1872, he took his first two Science certificates, viz., 1st class Elementary Magnetism and Electricity and 2nd class Elementary Physiology. Transferred in 1872 to a more advanced school in Banbury (Oxon.), concurrently with science, he there became acquainted with art, at the Art School. In 1873 he passed the three subjects of First Grade Art, with prizes in two of them, and his sheet drawings forwarded to South Kensington were approved in 1873 and the four following years, culminating in 1876 with a prize for an outline drawing of Hercules. In 1873 he secured an Advanced certificate in Physiology, and an Elementary in Physical Geography. At the close of the year he took 3rd class Honours in the Cambridge Local Junior Examinations. In 1874, in Art, he added the 2nd Grade Model Drawing certificate, and in Science 1st class Elementary certificates in Practical Plane and Solid Geometry and Physical Geography, with 2nd class certificates in Mathematics, Theoretical Mechanics, and Biology. In 1875 he further advanced in Art, with a prize in 2nd Grade Freehand and a pass in Geometry, with an Advanced certificate in Practical Plane and Solid Geometry, and 1st class Elementary in Sound, Light, and Heat. At the Christmas Cambridge Local Examinations of 1875 he passed in the Senior Stage. In 1876 he completed his 2nd Grade Art certificate with "Excellent" in perspective, and in Science took Advanced certificates in Magnetism and Electricity and Biology (Annual section), as well as 1st class Elementary certificates in Machine Construction and Drawing and Geology. At the close of the year, just previous to leaving school, he took 3rd class Honours in the Senior division at the Cambridge Local Examinations. His progress was thus signalised by continual prizes.

He then resided in Glasgow, and became acquainted with Lithography at the establishment of Messrs. Christie & Crockett—a firm which was dissolved a few years later, the former going to London and the latter continuing in business in Glasgow.

From Glasgow he went to Manchester. After apparent indolence for a year or so he resumed his studies at the Mechanics' Institute at Hyde, and in 1879 secured a 1st class Advanced certificate in Machine Construction and Drawing, and 2nd Advanced in Sound, Light, and Heat; winning also one of the money prizes given by Mr. Thos. Ashton, the cotton manufacturer. In the autumn of 1879 he joined the night classes in Science under the Manchester School Board, and in 1880 secured 1st class Elementary certificates in Inorganic Chemistry (theory and practice), Botany, and Building Construction and Drawing. In 1880-81 a slight attack of congestion of the brain prevented the continuance of courses in Inorganic and Organic Chemistry and Geology, but he succeeded in obtaining 1st class Advanced in Building Construction and 2nd class Advanced in Botany in 1881. The following year he, however, took Advanced certificates in Inorganic Chemistry both in Theory and Practical Analysis. In 1883 he obtained 1st class Advanced certificates in Botany and Biology (Vegetable Section), and has not since competed in these Science and Art Department Examinations. It will be seen that the promise of his early school days was well sustained.

CHARLES HARRAP.

His apprenticeship to lithography, as a draughtsman, commenced in 1877, with Mr. Isaac W. Petty, of Deansgate, Manchester, and concluded in 1882, when the firm itself dissolved. During the five years, he had been under the instruction of Mr. G. H. Johnson, one of Mr. Balderstein's apt pupils, from Messrs. Bemrose & Sons, of Derby. He acquired a very general knowledge of the wide range of lithographic

drawing, and before the close of his apprenticeship had executed large fashion plates and sets of parliamentary plans without supervision.

Mr. Johnson joined with him in business as trade artists. This was carried on, with anything but satisfactory results, until December, 1883, when the two friends parted. Mr. Harrap was then employed by Messrs. H. Blacklock & Co., of Albert-square, Manchester, where he became intimately acquainted with almost every branch of lithography.

Concurrently with business, from 1881, he taught Science Classes under the Manchester School Board, Technical School, and other institutions until 1888, when the increased employment of time in other directions compelled him to relinquish this occupation. During the period from July, 1885, to February, 1887, he fulfilled the duties of Secretary to the Manchester and District Science and Art Teachers' Association; and from the Autumn of 1886 he has conducted the Class in Lithographic Printing at the Manchester Technical School.

It was in the summer of the year before (1885) that the oft expressed opinions of lithographic artists induced him to attempt the formation of a Society for lithographic draughtsmen and engravers. Through the kind co-operation of Mr. G. D. Kelly (now Councillor of the city of Manchester) he was enabled to rapidly attain the object in view; and on September 26th, 1885, was founded the now flourishing Society. He has been retained as the General Secretary of this movement during the seven years of its existence, and has twice attended the annual congresses, and thrice the newly formed Printing and Kindred Trades' Conferences.

In his connection with the great co-operative distributive movement, he was elected in the spring of 1890 as secretary of a small committee to formulate a scheme of rules for a building society department of the Manchester and Salford Equitable Co-operative Society. The scheme was based on purely philanthropic lines, as previously indicated by his letters to the Society's *Herald*. It received a large measure of support, but was ultimately rejected by the narrow majority of one.

In the summer of 1891 the idea of starting THE BRITISH LITHOGRAPHER was conceived, and he was invited by Mr. Robert Hilton to undertake the position of co-editor, an engagement which he not unwillingly accepted.

It will be seen from the foregoing sketch that Mr. Harrap has done good service for the craft, and is, both by education and experience, well fitted to occupy the position he holds as technical instructor in one of the most important British centres of industry.

THE recent revival of etching has been accompanied by quite a series of first-rate exhibitions of etchers' art. At the present time there is a fine collection to be seen at the Wolverhampton Art Gallery, consisting of some twenty specimens of each of the following artists' productions: Professor Herkomer, R.A., Professor A. Legros, Mr. F. S. Haden, Mr. S. Palmer, Mr. F. Short, and Mr. C. J. Watson.

Photo-Engravings for Newspapers.

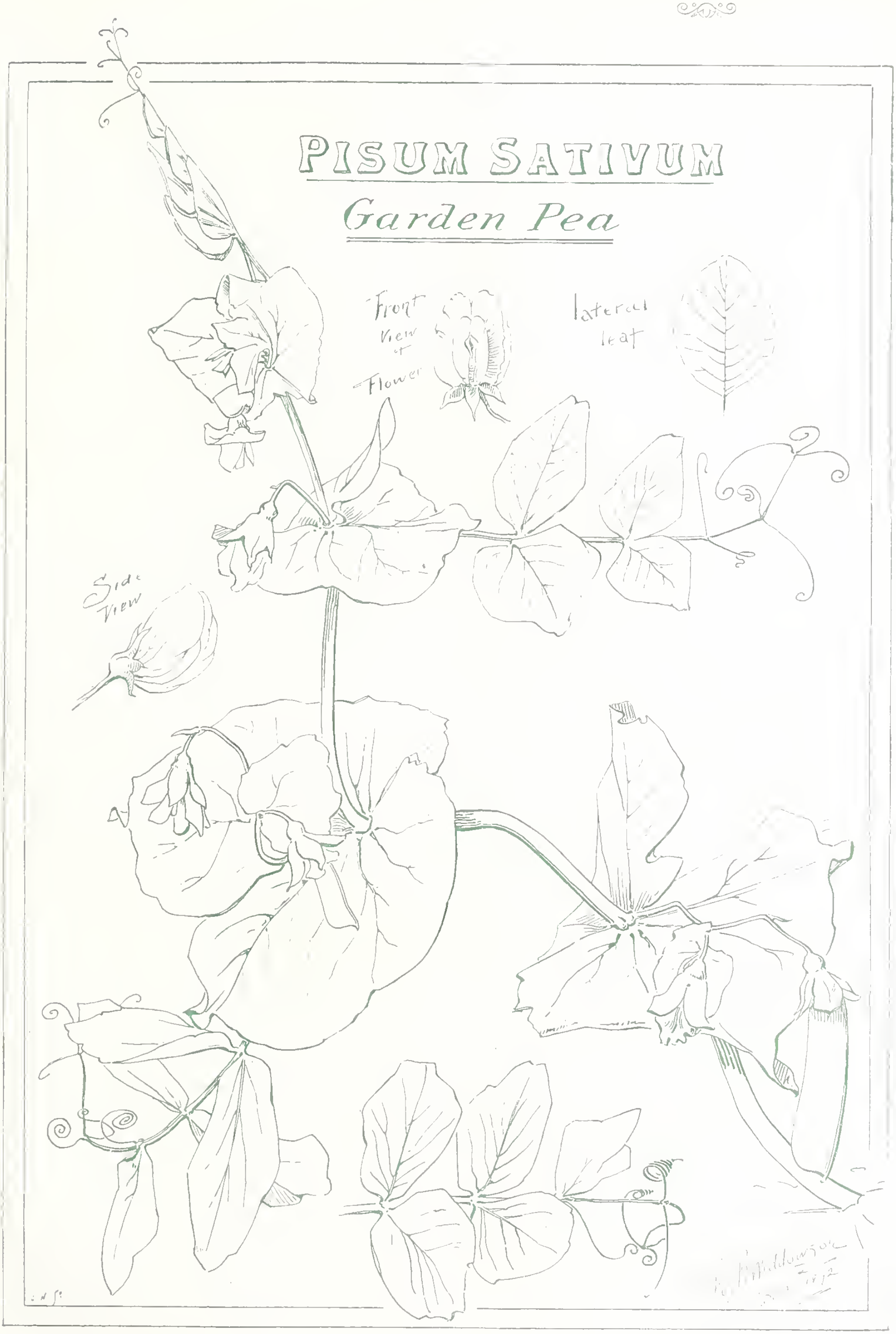
MR. H. SUTTON, at a recent meeting of the Camera Club, showed that he had effected the direct conversion of photographs into blocks without intermediate conversion into fatty ink or bitumen images, and without the subsequent skilled etching to get type-high blocks. He simply electrotyped a relief image produced in the gelatine bromide film of an ordinary negative; the electrotype being at once passed on to the printer.

A gelatine bromide negative is developed with alkaline pyrogallol or quinol, then fixed in strong hyposulphite of soda and washed with care, so that it shall not absorb too much water. If it be now placed horizontally on a metal plate, and gradually heated to 212° Fahr. by the flame of a Bunsen's burner, the shadows of the image will be seen to run all over the plate. If, however, before development the negative had also been impressed under a crossed line screen, so that the line screen and the picture would develop together, each little dot of the screen image would hold a certain amount of reduced silver, bearing some definite proportion to the action of light and development, and be surrounded by a fine line containing no silver where the opacity of the screen had prevented action.

The reduced silver produces a certain amount of insolubility of the gelatine with which it is in contaet, and the adjacent soluble gelatine, when heated, as already described, runs beneath the insoluble gelatine by capillary action, thus producing dots and an image in relief. This capillary action is proportional in some way to the amount of reduced silver, and during the heating the two effects of relief and graduation are produced at the same time. The electrotype is taken direct from the glass negative in relief. A process of this kind ought to give great impetus to the graphic arts.

MR. FREDERICK E. IVES, of Philadelphia, has recently delivered at the Royal Institution lectures on "Photography in the Colours of Nature." With the subject of the production of permanent-colour prints by his process Mr. Ives dealt very briefly; indeed, he frankly admitted that sueh prints could only be produced by a complicated process, which required a considerable scientific knowledge of the laws of colour sensation on the part of the operator, and at a cost which precluded the possibility of profitable manufacture. He claimed, however, that by the application of his invention to the helio-chromoscope he had actually solved the problem of photography in the colours of nature, since the illusion thus produced was more perfect than could possibly be obtained by means of a photographic print.

THINGS are very quiet in Montreal and have been for a long time past. The Burland lithographie establishment is in process of liquidation and, it is expected, will shortly be sold off, as no one can be found willing to invest the required capital in the concern.



PLANT FORM.—No. 5.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

DE MONTFORT PRESS.

Photography in Illustration.

WITH the increasing use of half-tone work and the numerous processes for book illustration that have been developed or adapted during the past ten or fifteen years, there has steadily grown a tendency on the part of publishers, process men, and in some instances among critics, to apply entirely inappropriate names to the reproductions, that are misleading in the extreme and cannot but do an injury to the better classes of work by giving their names to processes much their inferiors in quality. In very many cases these misappropriations are not so much the result of ignorance as a desire to profit by stolen glory that attends their use.

Let us first consider the ordinary half-tone photo-engraving of which so much has lately been seen in the way of illustrations for the higher-class periodicals and works of an art and technical nature. We shall find, says Anthony's Photographic Bulletin, that these prints all render the half tone of the original; or, to be less technical, shew the various degrees of light and shade in masses of colour, differing in degree, but in flat tints, produced by breaking the original subject, that may have been either a wash drawing, painting in colour, portrait from life or view from nature, into an immense number of dots, obtained by photographing through the fine meshes of a ruled glass in a manner not necessary for description here.

The resulting picture is transferred to the metal that is to serve as the finished plate; the chemical action is proceeded with, and the half-tone plate that results shews the picture in relief and the entire surface of the plate a mass of fine points and dots, separated by fine furrows running in transverse directions, the points in relief being the printing surfaces. The plate being mounted on wood or metal to render it of the same height as type, it is inked up with a roller in the same manner that type is, and the ink, adhering to the points, is impressed into the paper that is brought into contact with them in the printing press. It should here be noted that the points or dots making up the printing surface of the plate, being all of the same height, the amount of ink deposited on the paper is of the same depth or thickness from each and every printing point, and it naturally follows that variations in the light and shade making up the picture are dependent on the number and size of such dots within a given radius; thus a heavy shadow in a picture printed from relief plate will be seen to be composed of a large number of these dots, often so close together as to merge into one another, while the high lights are the result of a preponderance of the clear transverse lines that serve to separate the dots more widely, only shewing them sufficiently to give form and colour to their object.

The above are the principal points of identification of a print made from a half-tone type plate in relief, and are easily to be distinguished from pictures produced from intaglio plates, as will be shewn further on. There is still another kind of half-tone relief work, however, that is not so easily distinguished, and this is the photo-gelatine or heliotype and kindred processes, which, in rendering the gradations of colour, do not cut them up into dots, but lay the ink in smooth masses of different tones on the paper from a surface of gelatine. It is not the intention of this article to go into all the varying methods of printing in relief, but merely to contrast as strongly as possible the wide difference between the rightful photogravure and the many cheap illustrations printed in a type press that have so frequently been foisted on an unsuspecting public under the guise of such.

The photogravure is printed from an intaglio plate, and is not capable of being used in a type press under any conditions. It can only be successfully printed by an expert, and where with a relief plate the office boy might "kick off," say, 1,000 a day, or the steam cylinder press 10,000, the expert printer with his intaglio plate would not produce above 200 good impressions. The intaglio plate is filled while warm with a hard, stiff ink, which is pressed into every depression, and after the high lights of the plate are carefully "wiped off" by hand, the plate is run through the press, in connection with the paper, and the latter lifts from the sunken surface of the plate all the ink it has previously received, holding it on the surface of the paper in masses of colour that differ in depth and consequently in tone according to the depth of intaglio in different parts of the plate, the result of which is a series of gradations from the pure high light of the clear paper to the rich, velvety black of a solid body of ink spread over the surface of the paper and not pressed into it. The grain, too, of this plate, instead of being composed of noticeable cross-hatchings of lines and dots, is a scarcely-discernible "tooth," that is obtained by chemical action on the metal plate before the picture to be etched is transferred thereto. Carbon tissue being the medium through which the transfer is made, and the finished print very closely resembling in most of its features that beautiful pigment, it is a wonder that the feeling of those interested in seeing justice done to all has not been more forcibly expressed on this subject before. A name that would answer the purpose and still be meritorious, is the old title photograph, as it applies to all plates which give reproductions from relief surfaces, while photogravure is properly used only in opposite connection. Let all then, who know better, be honest enough to call things what they are, and thus do what they can to avoid further complication of the already multitudinous collection of process names in existence both in this country and abroad.—*Queries Magazine.*

FOR the purposes of the general election, Messrs. D. F. Taylor & Co., of Birmingham, have issued a large presentation plate in photo-lithography of the leaders of both Houses of Parliament, embellished with national emblems. The portraits are admirably executed, and the sheet is offered at a price that should secure for it a large demand.

What is Colour?

THE TEACHINGS OF THE SPECTRUM.

CHAPTER I.

How prevalent is the notion that colour is paint, even in a country where the rainbow is so often seen, and the thinking mind at once admits that the rainbow is not produced by bands of paint in the atmosphere. Not alone does the rainbow afford an uncontrovertible instance that colour is not paint, but there are many familiar examples throwing similar evidence against such an assertion. A piece of glass is almost colourless. Sometimes it has a slight straw tinge, and for the present purpose, if a piece of this straw-tinged glass be well ground with sand, or exposed to a sand blast, the whole aspect of the glass is changed to an opaque grey. This change is not effected by adding any paint or new material to the glass, but by simply altering its molecular structure. Again, if a fine piece of metal be engraved very closely with parallel lines, say 10,000 to 14,000 to the inch, the metal, held in certain positions, will exhibit the rainbow colours. Or, if a piece of fine crown glass be cut into a triangular prism, all objects viewed through the prism appear to have their edges fringed with the rainbow colours. In neither of these instances has any paint been used, and the whole phenomenon depends upon the vagaries of light. Bringing the matter closer to the direct experience of the printer and artist, how many instances can be picked out in which the very light of the day or light of the night plays an important part in the discrimination of colour. On this particular planet we have a clear white light, and our colours are judged accordingly. Possibly on other planets—Mars for instance—the light of the atmosphere is quite another tone, and with our eyes the beings there would designate colours very differently to what we do here. Colour all depends on the light in which it is viewed, yea, even the colour of a crime! A scarlet geranium taken into a coal mine would lose its original colour, and just according to the light thrown upon it the miner would classify its colour. Everything in darkness is devoid of colour. Another striking and familiar example of how colour depends upon illumination is seen in the pantomime costumes, which are constantly being altered in colour by varying the shades placed before the electric light. This is such a strong instance that it is difficult to realise the true colour when the white or yellow lights are finally turned up. Yet none of these changes depend upon new applications of paint or stain; the whole depends upon the quality and quantity of light in which the objects are viewed. If, in viewing a garden full of flowers, with their splendid colours, in broad daylight, a pause be made and the shades of evening allowed to approach, the colours of the flowers will gradually be lost; first the deep-toned flowers and later the bright ones become indistinguishable by colour, only the outlines being perceptible. So it is with all bodies which are not self-luminous; light must fall upon them and illuminate them, and the light which they reflect may be coloured if they possess the qualities to reflect coloured light. This is the point upon which the whole colour sensation turns. Look, for instance, at the beautiful colours reflected from a mere soap bubble, or from a piece of china or porcelain smeared with soap and water. These colourations do not owe their origin to any pigment in the reflecting body, but simply to an internal disposition of the crystalline structure of the matter employed, namely, the soap and water in thin films.

There is not the least doubt that colour is greatly altered, to our perception, by the nature of the light in which it is viewed. Lithographers know only too well that the yellow which was passed at night for a nice pale tone, comes out in daylight as a raw disappointing shade, which ultimately spoils the whole work. Again, how often are pinks intentionally subdued in gaslight because they look so scarlet, and when seen in daylight are found to have been reduced far too much. Blue, especially in pale tints, suffers much in the same way, the yellow gaslight giving it a green cast. Some of these difficulties are overcome by using electric light, but its use is confined to a very small number of houses, leaving those without it to contend with the difficulties already cited. To overcome these difficulties is a matter of long experience, unless comparative colour charts are prepared, with elaborate descriptions of the colours and such instances referred to as are within easy reach, or are in the memory of those using the pigments. Such charts being constantly used in daylight and gaslight as the standards of colours, great divergencies of tone may be avoided. Nowadays, there is so little time allowed for experimenting or preparing even the simplest charts, that many employers are quite satisfied so long as the colour is something near the sketch, and there is no delay in passing the colours in any light. This is the old penny wise and pound foolish method, and it would be greatly to the advantage of the employer, and would increase the value of his employés, were he to allow reasonable time for these necessary experiments. How many employers of to-day dare not introduce a new thing into their establishments simply because it might take a little time to master, little thinking that the time thus spent will eventually reap its benefits two and three fold. Thus it is that the great mass of printing, including much colour work, is rushed through the firms regardless of it being well done so long as it meets the customers' requirements, and it pays. This consideration is gradually causing the ruin of the whole business, which must have a crisis at no very distant future.

Reverting to the point already raised, that is, the difficulty of printing colours by gaslight, there were some of the old school of lithographers who were always accustomed to use a special palette, with the result that the particular colours used varied in appearance only to a very small extent from their appearance in daylight, when viewed in gaslight. The days of cheapness, gaudy prints, and rapidity of execution, have very greatly displaced the old,

well-founded ideas, and have established in most firms a superficial mode of producing coloured prints which lack the beauty and mellowness of lithographs of twenty-five years ago.

CHAPTER II.

In treating the subject of colour from a philosophical point of view, so much of a doubtful and uncertain character comes under consideration that one is forced to come to the conclusion that in all probability there are no primary colours at all, and the mixture of coloured lights—or colour in its true sense—has little or nothing in common with the mixture of pigments. It is by no means a recent demonstration that green is just as likely, and perhaps more so, to be a primary, as yellow. Wünsch showed this in 1792; but as the public generally and the scientists of the day had already formulated their ideas on the matter, his assertions and experiments met with little or no consideration. It was then accepted that red, yellow, and blue were the primaries from which could be prepared all the other colours of the rainbow; and it was confidently believed that these three primaries must be present in stated proportions to form white light. Many of the present generation may have forgotten the toy tops with segments of coloured paper on the upper surface, which, when set spinning, appear almost white—a pale, creamy white. This toy served its purpose in the education of those who saw it, for, without a doubt, the different segments of paper, when revolving rapidly in a circle, combined their colours to form the compound white light, thus proving that the light which could be broken up to form the rainbow could be built up again from its elements. Thus it became a recognised assumption that the three primaries at least must be present to produce white light. Such an assumption, however, was completely shattered when Helmhotz, in 1852, combined indigo and yellow in such proportions that to the unaided eye it was white. This seemed also to shew that yellow could no longer be regarded as a simple colour; how long we shall continue to regard it as one is difficult to say, for light is not like chemicals, it cannot be taken by anybody and analysed and put away in bottles, or experimented upon with the same certainty. The preconceived idea is difficult to eradicate. Not as when Sir Humphrey Davy proved to the world, in the early part of the present century, that a certain chemical—sodium hydrate, or caustic soda—was not a simple element like oxygen, hydrogen, nitrogen, and iron are now considered to be, but that it was composed of the three elements, sodium, oxygen, and hydrogen. Such a demonstration cannot be overruled; but with light it is vastly different. Philosophers may demonstrate, but all to no purpose. Even the deeply rooted impression that blue and yellow form green is a misconception. It is true that a mixture of blue paint and yellow paint form a green paint, but if two pieces of blue and yellow paper be manipulated with a piece of window glass the light reflected is not at all green, and would, if the exact shades of the two could be produced in purity, give almost white. Carrying these enquiries still further, it was proved by Clark-Maxwell, in 1860, that yellow could be produced by a proper mixture of red and green, thus apparently putting an end to the pretensions of yellow to be considered a primary colour.

From such assertions as the foregoing it is plain that the study of colour cannot be thoroughly perfected without a knowledge of the nature of light, and the wonderful manner in which the ordinary light of day can be split up into segments, some of which convey the impression of brilliant colours, whilst other segments become invisible, and can only be made appreciable by curious experiments.

All natural forces which affect our organs of sense through the medium of the air, such as sound, light, and touch (the latter more especially referring to heat), are apparently due to a rhythmic oscillation or wave movement of the air or ether which constitutes the atmosphere of this planet, and which, according to the length or depth of the waves thus produced, may become apparent to our senses as sound, light, or heat. We cannot formulate any rules as to the relations of these several waves, but it is quite certain that whilst sound travels at about 1,100 feet per second, light travels at over 190,000 miles per second; and to bring a species of relationship between light and sound it can be shown that the lowest appreciable colour tone, viz., red, makes 420 billions of vibrations in a second, whilst the note A in the second space of the treble clef only makes about 420 vibrations per second. Here, however, all analogy between colour and sound ends, for, whilst any particular colour can be varied in shade in the most minute degree, a note can only have its sharps, flats, and its octaves. True there can be harmonies of colour and harmonies of sound worked out on an arithmetical basis so as to appear to have some relationship. But this is all the vague ingenuity of imagination unless we are prepared to consider all colours as the outcome and simple variation of one colour, and all sounds as simply the extension of one sound, the latter, of course, bearing strictly on the generally accepted definition of musical sound.

The use of the words harmony and contrast have been misplaced, and by a careful playing upon these words some painstaking compiler has spent years of his life working out great charts of harmonies, chords, octaves, etc., of colour, and has referred them to their musical equivalent in name only. But such a relationship was never needed, either by the colourist or musician, and it is useless to compile such a vast work which has no practical purpose in view.

Returning to the subject of light, there seems little doubt that the waves of which it seems to be composed are capable of disturbing the constitution of some materials. It is assumed that light alone is the cause of the disintegration of crystals of realgar, and it can scarcely be contradicted that light acts in a positive manner upon photographic sensitised plates when exposed. So sure are scientists that light is really a wave movement that they have gone so far as to set down the length of the waves of differently coloured lights, and it is now assumed that the length of a wave of violet is only about one-half the length of

a wave of red. Notwithstanding the compound nature of white light, and these variations in the lengths of the waves of the colours of which it is composed, yet it is accepted that all colours travel at the same speed, and that it is only when some peculiarly constructed material, such as glass in prisms, is placed in its course that the colours of which white light is composed become perceptible, because, although they travel in direct lines at the same speed, yet when they are caused to turn a corner there is a parting of company, and the shortest waved colour, viz., violet, bends most out of its direct course, whilst red bends least, and between these extremes are found the remaining colours of the spectrum, corresponding to the familiar colours of the rainbow, with its red external and blue internal arches.

[To be continued.]

Pommade Emolliente.

A SUBSTITUTE FOR VARNISH.

The pommade emolliente as now used exclusively in France is very similar in appearance to vaseline, but has a duller aspect. Vaseline, although used by printers and printing-ink makers with great success, would be far too greasy to use in place of varnish. With the pommade it is otherwise. The maker, Mons. E. Trochard, of Chartres, France, has favoured us with a sample of this substance, and we have handed it to an experienced printer—Mr. R. G. Lloyd, of Manchester—to prove its practical value.

There does not seem to be the slightest doubt as to its working qualifications and its economy. In use for body colours, it does not require more than one quarter the amount of the varnish that would be necessary; and in cases where it is necessary to add tallow or other raw oil to the ink to make it work evenly instead of lumpy, this pommade effects the change at once. Any ink which it is known will generally work in this manner, when mixed exclusively with this pommade works as smoothly as it is possible to get an ink to work. Those who have used tallow know that in the course of printing the tallow causes a very injurious separation of the ink and tallow, the rollers finally only being able to pick up a thinned colour instead of the original body-colour mixed. The remainder of the ink has become firmly caked on the slab and rollers, more especially towards the sides, and requires considerable time and labour to remove it. Not so with the pommade. Everything runs smoothly. The last impression is as good as the first, and the rollers and slab are readily cleaned up for a new colour. The pommade again can be used with the certainty that where it has been found that varnish spoils a colour's brilliance in drying, this solid oil will not do so.

Perhaps the printing of bronze presents more difficulties than any other form of printing. In this journal has already appeared an exhaustive article on "Bronzing and Dusting," but such things are always open to supplementary discoveries. In that article it was pointed out that paste is very effective in bronze inks, and that the use of volatile oils is a great advantage. But it is now proved that a bronze ink composed of stiff varnish, gold size, and a small amount of this pommade is one than which a better cannot be procured. In preparing a printing ink in which paste is added, the printer is familiar with the buttery consistence which it gives the ink in contradistinction to the stringy nature of varnish ink. In the same way the addition of this pommade also gives a buttery character which will at once be recognised by the printer, and can be taken as a sign that it is correct for working.

The pommade does not in any way interfere with drying; in fact, the experiments have proved that it rather assists it.

The cost of the pommade is five francs per kilogramme, or about 4/- for 35 ounces, which, considering that only about one quarter the amount is required than when using varnish, shews an economy in favour of the pommade.

All things considered, it seems highly probable that this solid, or one of a similar character, will entirely replace varnish in the lithographic printing trade.

Old-Time Charges for Lithography.

The following will be of interest in view of the close competition of the present day. It is copied from a circular issued by one of the first lithographic printers in England, and preserved in the lithographic print room at the British Museum. Wouldn't our readers like to get such prices nowadays!

G. J. VOLLWEILLER'S POLYANTOGRAPHIC OFFICE FOR AMATEURS WHO WISH TO DRAW ON STONE.

Terms:			£	s.	d.
Mr. G. J. Vollweiller sends a stone, gives the ink and chalk necessary for drawing, and delivers 50 impressions			1	11	6
25 impressions			1	1	0
If more impressions are ordered, the price for		100 copies in chalk	1	11	6
	Paper Extra.	50 ,, ,,	0	16	0
		25 ,, ,,	0	9	0
		100 ,, in ink	1	10	0
		50 ,, ,,	0	12	0
		25 ,, ,,	0	7	0

The stone, with the engraving, must be returned in a fortnight's time. If kept longer it will be charged with half-a-crown per week. After the delivery of the 25 or 50 impressions, the stone remains eight days for further orders, and if they are not given within that time the drawing is erased off. If it is desired to let the drawing remain longer on the stone 5/- per month will be charged. If a single copy or a few impressions are desired they will be charged 1/- apiece.

The Portfolio for June contains amongst its three etchings one by W. Hole, R.A., from the portrait of Rembrandt in the Imperial Gallery of Vienna.

"THE SHEPHERDESS."

AFTER ANGELICA KAUFFMANN (1741-1807).

(Reproduced from Mezzotint.)

DE MONTFORT PRESS

The "British Lithographer" Examination Papers.

Result of Third Examination Paper, set April 1st, 1892.

ELEMENTARY.

No.	Names of Competitors.	No. of Questions Worked.	Full Marks obtained for Answers to Nos.	No. of Marks given for each respective Answer.								Total.	Possible Total.
				1	2	3	4	5	6	7	8		
1	Henry Wm. Ashman, Derby -	ALL	—	15	23	18	20	20	13	5	15	129 71·66%	180
2	Wm. B. Ridgard, Derby - -	ALL	—	6	22	14	18	13	13	3	16	105 58·33%	180
3	E. A. Coups, Manchester - -	ALL	—	10	8	17	10	15	10	1	12	83 46·11%	180

ADVANCED.

No.	Names of Competitors.	No. of Questions Worked.	Full Marks obtained for Answers to Nos.	1	2	3	4	5	6	7	8	Total.	Possible Total.
1	R. Snowdon, Accrington - -	ALL	6	16	23	25	25	18	20	10	2	139 75·13%	185
2	Wm. Clarke, Derby - - - -	ALL	—	16	17	22	23	19	16	2	14	129 69·73%	185
3	Charles Ridgard, Derby - -	ALL	5	19	18	10	20	20	15	—	13	115 62·16%	185
4	W. S. Fraser, Derby - - -	ALL	—	17	15	18	22	14	14	2	10	112 60·54%	185

REMARKS.

The questions in both papers were of such a nature as to call forth an amount of ingenuity and originality in the answers, which has been responded to in excellent style. Some of the answers, however, indicate that they have been derived from the same source; this is shewn especially in Advanced Answers to No. 5. It is singular that both in the Elementary and Advanced there were questions which could not be answered from text books, and in these there is a lack of information.

QUESTIONS WORKED OUT.

Elementary Grade.

By Henry William Ashman, Derby.

QUESTION I.—Give a clear description of the production of a circular by lithography. (20)

Answer: A circular may be produced by lithography in two ways, viz., by writing backwards upon the stone or by writing the positive way upon a piece of transfer paper and then transferring to stone. The safest and best method is to write direct on to the stone. This is done by taking a clean, well-polished stone, and placing it in front of a slow fire, so as to take all the cold moisture out. The size of the letters is then marked off by making a series of double lines with a brass-pointed spring-bow pen. Across the parallel lines rule a convenient number of lines at an angle with them of from 45 to 50 degrees, as a guide for the slope of the letter. The letters may then be sketched out with a brass point (brass being preferable for marking off, as it does not print). After the sketch is made it is drawn over with a fine lithographic writing brush and some good litho writing ink, making both the up and down strokes of the letters with down strokes of the brush. After the writing is finished it is handed to the printer, who, after having dried the writing by means of a fan, gums the surface of the stone over with gum arabic, so as to prevent the letters from thickening, and to form on the clean parts of the stone a metagummate of calcium, which prevents any further grease attaching itself to the stone. When the gum has dried, the writing is forced up with a piece of rag charged with a little thin litho printing ink and a gum sponge with a little gum arabic in it. When this has been done the gum should be washed away with clean water and the stone slightly damped. A hand roller charged with a little printing ink should then be passed over the circular, so as to ink the letters up more firmly, then dusted over with French chalk. The superfluous ink is then cleaned away with either snakestone, picker, or an acid point. When the dirt is cleaned away it should be rolled up and dusted over a second time, and then etched with a solution of nitric acid and gum-water. This is washed off with clean water, the stone dried, and finally gummed up with pure gum arabic. It is then ready to be printed at machine.

When writing the circular on transfer paper, the shapes of the letters are made in the same manner, but made to read the positive way instead of the negative way. When finished writing it is handed to the transferer, who, after having transferred it, treats the circular in a similar manner as in the first method. (15)

[Autograph transfers are overlooked; and the use of pens as well as the writer's method of writing are not mentioned.—Ed.]

Question II.—Describe the method of stretching transfer paper for drawing on, and state what points should be attended to in drawing for transferring. (25)

Answer: The best method of stretching transfer paper for writing upon is to damp the back of the paper with a little clean water (use sparingly if thin paper) and lay it aside for a short time for the water to be absorbed. The edges of the paper should then be pasted or gummed to a drawing board, then take a few sheets of damp paper and place on top of the transfer paper, having them a little smaller so that they will not cover the gummed edges of the sheet. The object is to get the edges to dry before the centre of the paper. The centre being cold and damp, it contracts and draws itself up almost as tight as a drum head. Care should be taken in damping the transfer paper not to damage the composition, as the artist's instruments will not work smoothly on the face. A line should never be gone over twice with either the ruling-pen or brush whilst the ink is wet, as you may wipe out some of the composition of the paper, causing it to mix with the ink and destroy its qualities.

Thick ink should not be used where a series of lines are running in close contact with one another, as they will spread in transferring and probably form one solid mass instead of sharp clear lines. Lines made with thin ink will probably not go down on stone at all. Experience and practice is necessary for the artist to judge whether a thin, medium, or thick ink should be used. (23)

[Perhaps there has been some omission of words, which were thought unnecessary, but cold and damp paper does not contract and draw itself up as tight as a drum head.—Ed.]

Question III.—Describe fully how you would obtain a sharp open grain on the litho stone. State clearly all the materials you would use. (20)

Answer: Take a stone of an even grey or drab colour, free from specks, chalk spots, or crystal veins. This should be ground either by a levigator or by placing a smaller stone on top of it. Use sand sieved through a No. 60 sieve and a little water, keeping a good supply of sand and water on the stone whilst grinding. After having ground the surface, the sand should be washed off clean. Then take a straight-edge and lay on the surface of the stone to see that it is perfectly level. If it is found perfectly level, wash the stone clean with water and then commence to polish, using first the rough stone and then pumice-stone, so as to polish all marks of the sand away. Finally the stone is polished with "water of Ayr stone." To obtain a sharp open grain upon its surface, take a No. 100 or 120 sieve (according to the grain required) and sift through it sufficient silver sand to cover the surface of the stone. Then take a small piece of litho stone with well-rounded edges and a flat face, sprinkle a few drops of water on the stone and go over it with the muller in a motion describing circles, first going along the edge and then coming back, working a little farther from the edge every time, till you get to its opposite edge. More water will be required during the operation, and as the sand wears out more of that will be needed. The stone should not be finished off with sand that is a little worn, as the chances are that the stone will have a coarse sharp grain. But if the sand has been worn too long the result will be quite the opposite, as the grain will be quite flat. Therefore experience and practice is necessary to be able to judge when the sand has been used enough. In many cases emery powder is used in the place of sand, and has been found a very good substitute for it. (18)

Question IV.—What is meant by keystones for colour work? How are they obtained? Give at least three methods. (25)

Answer: Keystones for colour work are stones that contain an outline of all the detail of the work. In many cases of showcard work the keystone is used for the black by taking away the outline where it is not wanted to be seen on the sheet. But in pictorial work it is generally used for pulling impressions from for making set-offs only. There are several methods of obtaining keystones. The first is to fasten a sheet of tracing paper over the copy on to a drawing board by means of small drawing pins. Then trace the outline of all that may be required with litho writing-brush and ink. After having obtained a correct tracing, it should be laid face downwards upon a clean stone and passed through the press; the ink will fix itself upon the stone and you will have a key-stone to pull the impression from for making set-offs for the other colours. Another method is to make a tracing in blacklead instead of ink, and lay face down upon the stone, laying between the tracing paper and the face of the stone a sheet of red chalk-paper, then go over the back of the tracing with a tracing point. Having gone all over it with the point, a faint tracing will be seen on the stone, which should be drawn over with brush and ink. Another method is to take a sheet of gelatine and fasten on top of the copy. The tracing is then made by cutting into the gelatine with an engraver's steel point. The lines are then filled in with retransfer ink in the same manner as copper-plate engravings are filled in and cleaned. It may be run down on the stone by slightly damping the surface of the stone with turpentine and passing it through the press once; or it may be damped in the damping book and run down on a lukewarm stone: this method is considered the best. (20)

[In the first method mentioned it should be "transfer tracing paper" which is used.—Ed.]

Question V.—Are there any advantages of writing or drawing on transfer paper for transferring over the method of writing direct on stone? Give reasons for your answer. (25)

Answer: The advantage of using transfer paper for writing or drawing upon is that it does away with writing backwards as upon stone. If it be thin tracing

transfer paper that you wish to use, you may place it over the top of the copy and get a drawing exactly like it with very little trouble. These are about the only two advantages that it has over the method of writing direct on the stone. It is liable to accidents whilst being transferred, as the paper may have absorbed part of the ink owing to the composition not being strong enough to retain it. The paper may stretch or get baggy, or even it may not go down at all in places, owing to the scraper or the stone not being perfectly level. So that writing on transfer paper has more disadvantages than writing direct upon stone. By writing upon the stone, a sharper and clearer impression may be pulled than when written upon transfer paper. (20)

QUESTION VI.—State what you know of the defects in litho stones, their cause, and influence on the work. (15)

ANSWER: The litho stones are very compact homogeneous limestones, varying in colour. The light-tinted stones are a great deal softer than the dark ones. The soft stones absorb both grease and water very readily, but the grease soon wears away after a short number of impressions has been pulled from it. The dark stones contain more salts of iron than the light ones. They do not absorb the fatty ink so readily as the light ones, but will stand a greater number of impressions pulling from them. Some stones have light chalk veins running through them, caused by cracks after the formation of the stone. The stone at some time or other will break in the same direction as the vein. The vein generally gives a white mark in the impression. Some stones have crystals and crystal veins: they are formed by the fusion of metal salts having percolated through a crack at some time or other. These veins, in graining for chalk work, receive the grain differently. Dark veins will print and white ones leave a white on the impression. Some stones are covered with light spots called chalk spots: they are caused by water charged with carbonate of lime constantly washing over them; these are not fit for the very commonest work, as the acid attacks the chalk spots with greater energy than the other parts of the stone. Other stones have light and dark patches upon their surface; they are unfit for drawing upon, as the artist cannot see what effect he is producing during the progress of his work. Stones that have holes and specks scattered over the surface should only be used for the very commonest work. (13)

[If chalk spots are caused by water charged with carbonate of lime washing over the stones, how is it that some parts form spots and others do not, since the stone is homogeneous? It is far more likely to be shells of foraminifera, which have been imbedded in the lithographic stone deposit.—ED.]

QUESTION VII.—Define what is meant by the following terms in relation to colour:—Body, power, tint, shade, and hue. (20)

ANSWER: Body is chiefly spoken of colours that have great body power. It is mostly spoken of opaque colours, as they have the power of partially hiding underlying pigments.

Power is a term generally given to transparent colours that have the power of imparting their own particular hue to other coloured pigments.

Tint is a colour reduced from its full strength by the addition of either white or linseed oil varnish.

In speaking of shade we generally mean the tone, which is the colour referred to darkened by the addition of another pigment of the same class.

Hue refers to a colour changed to a warmer or a colder tone. For instance, if you take some blue and add a little yellow, forming a greenish blue, you will have what is termed a blue with a greenish hue. (5)

[Body.—Consistency, thickness, substance as opposed to thinness.

Power.—The capacity of a colour to outshine others. A colour of great power will stand much reduction.

Tint.—A trace of a colour. A colour much reduced, so as to be distinguishable as the colour only in a minor degree.

Shade.—Has a double meaning. It may be the depth of a picture, or, as applicable to colours, it has been inadvertently used for tone. Thus, a brown may have a greyish shade or tone; a green may be of a blue shade or tone; and such like.

Hue.—The name of the colour, according to Captain Abney.

The whole category of terms—colour, hue, shade, tone, cast, and tint—have been used so indiscriminately as to make it impossible to separate them satisfactorily to meet all views.—ED.]

QUESTION VIII.—What do you consider the best means of insuring register on press and machine? (30)

ANSWER: The best means of insuring register on press is first of all to hang the paper up for a short time and then have it rolled. The best means of laying the sheet upon the stone for any number of printings is by using needles. To work with needles, a fine line with another running across it should be drawn on the keystone. When the set-offs are run down these lines should be ruled in as well. The first colour is printed by laying the sheet to a lay-mark, which is a straight line marked in position along the top of the stone and another down the left-hand side by means of a piece of compositors' marking lead. The cross will then be printed with the remainder of the drawing. A needle should be pricked through the centre of the + at both ends as they are printed. In all the following colours a small hole should be made in the centre of cross on the stone, so that when the needles are put through the back of the sheet and placed in the small holes made in the stone, the sheet will fall down the needles and drop in its exact position every time when care is exercised in taking away the needles. It will therefore be seen that if there are ten or twelve printings in the job, there should be a corresponding number of crosses at both ends of the sheet, and if the sheet has been laid on true every time they should look like one, as on the keystone.

Registering on the machine chiefly depends upon its build. It should be strongly and solidly built. The side frames should be fixed so as to run dead parallel one with another. The cog-wheels should all be machine-cut, as they then are more true and work together without the least jump. If the cogs are not working true one with another, it will throw the machine out of register. If the cylinder vibrates or jumps, owing to the brasses being worn, it will throw the sheet out of register. The side lay should be seen to every now and then, to see that it is not worn in one place more than another. The brake on the cylinder wheel should not be allowed to get greasy, as the cylinder will probably make a jump and go

round faster than the carriage is travelling. To get dead register these points should be attended to. If any of the screws have worked loose, the machine may be thrown out of register; it is therefore necessary to go round the machine occasionally and tighten them up. (15)

Advanced Grade.

By R. Snowdon, Accrington.

Question I.—Explain the cause of setting-off and slurring on press and machine, and give remedies. (20)

Answer: Setting-off on either press or machine is a transferring of some portion of the ink of a printed sheet before being dry to the back of the sheet placed directly above it, or, when backing the work, before the side first printed is perfectly dry. It may arise from various causes, such as the hardness of the paper, or the use of an ink unsuitable to the paper, or by printing the job too full, and placing too many sheets together. This may be remedied by using suitable ink, or dusting the impressions with French chalk, or where perfect immunity from setting-off is required, placing a tissue between each sheet. When printing both sides of a sheet the side first printed may be dusted, or a sheet of oiled paper fixed to the backing board of the press or the cylinder of the machine, will prevent in a great degree the absorbing of the ink from the side first printed. By slurring is understood a doubling of the lines or other varieties of work composing the impression at some part of it, usually at the end of the pull or impression of the cylinder; on the hand-press it may arise from the paper being cockled or creased, the shifting of the sheet before the scraper passes over it, the scraper or the stone being hollow, or by the stretching of the paper by the pressure from not being sufficiently rolled. A block of wood placed under the tympan frame, to prevent it touching the stone until the end of the pull, is a remedy usually adopted, and by setting the scraper evenly to the stone. On the machine it may arise from the edges of the stone not being perfectly straight and properly rounded off, from the stretching of the paper, or the brush in front of the cylinder not being set close enough, thus allowing the sheet to bag before touching the stone; for remedies, let the edge of the stone be made perfectly true, and nicely rounded off; by passing the paper through the machine on a clean stone before printing, or letting the impression be a little easier on the back edge of the stone, by packing the gripper edge with one or two thicknesses of brown paper. (16)

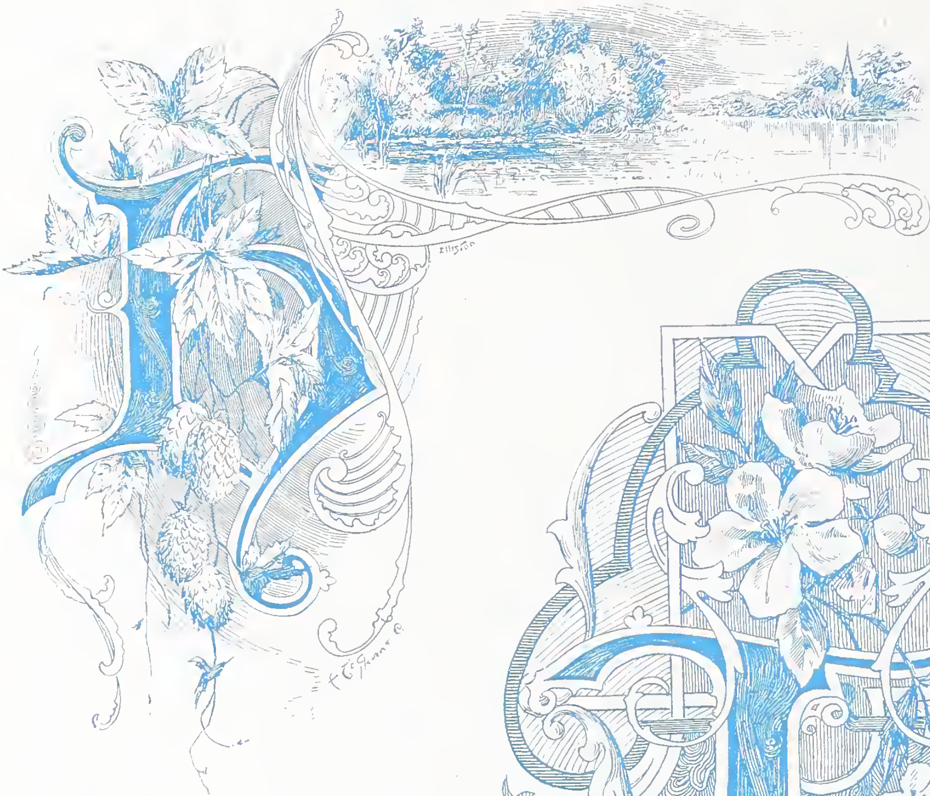
[To prevent setting-off no remedy is given to alter the nature of the ink.—Ed.]

Question II.—How should paper for chromo work be chosen: (1) for printing from flat stone, (2) for printing from grained stone? (25)

Answer: For the production of the best class of chromo work from polished stones dull enamel chromo paper should be used, and its choice regulated by the number of printings, the size, and the price allowed for the work when completed. Enamel chromo paper is usually manufactured in three grades, called one-coat, two-coat, and three-coat paper, so that the greater the number of printings the thicker should be the coating of enamel. The best paper is manufactured from size made from parchment cuttings and zinc white, the soft velvety surface being imparted to it by rolling between metal plates, and is also a great aid to securing good register by preventing the stretching of the paper. When of good quality it should rapidly absorb moisture, and feel adhesive when the tip of the tongue is applied to it. Commoner qualities are manufactured from glue size and white lead, but they have a hard and not such an absorbent surface. Where the number of printings does not exceed six or eight one-coat paper should be used, up to sixteen or eighteen two-coat, and above that number three-coat. When the price of the work will admit, if the job is a large one with large masses of colour, a thicker paper should be used than if for a smaller job, on account of register; and where the work has afterwards to be mounted, such as show-cards, a lighter paper might be employed. Paper for chromo work from grained stones should be of a different nature. In graining a stone for chalk work the sand used cuts up the surface of the stone into a series of points or dots, which in the aggregate make up the drawing; and these points, the tips of which receive the chalk deposited by the artist, do not all lie in one plane, there being a secondary series lower than the first; and as in inking a roller with a good nap is required to reach the bottom of the grain, so in printing, a good-bodied paper of a soft smooth nature should be employed in order to enter into the grain of the stone and print the job its full strength. Where cost is not a consideration plate paper is the best adapted, and a cheaper grade is one of the thick, soft, well-rolled printing papers, of which a great variety is in the market to choose from, preference being given to one that feels adhesive to the tip of the tongue. (23)

Question III.—How is grained paper for chalk drawing prepared? Give two methods, and say which gives the best results when transferred. Give reasons. (30)

Answer: To prepare transfer paper for graining for chalk work, take suitable sized sheets of drawing or cartridge paper, and with a flat hog-hair brush give them two coatings of a composition of the following ingredients: parchment cuttings, 4-oz.; starch, 4-oz.; flake white, 8-oz. Make the starch into a paste with boiling water, grind up the flake white with a muller, very fine; boil down the parchment cuttings sufficiently that when cold it forms a stiff, firm jelly; incorporate the ingredients by heat, and coat the paper whilst warm, then hang up to dry; when dry, give another coat, crossing the marks left by the brush at the first coating; again dry and press slightly, and it is ready for receiving the grain, which may be given in various ways, viz.: from a grained stone, an engraved steel or copper plate, from rollers, or from woven fabrics. To prepare the paper from a grained stone, take a very sharply-grained stone and set it in the lithographic press, taking care that the scraper is evenly adjusted



Suggestions.

Initials for Illuminating.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

DE MONTFORT PRESS.

Suggestions.

Initials for Illuminating.

Printed on Grosvenor, Chater & Co.'s "Acme" Printing Paper.

DE MONTFORT PRESS.

to the surface of the stone; place a piece of the coated paper face down on the stone, having first damped the back with clean water; place on the top a piece of clean paper, run through under heavy pressure, and carefully lift from the stone. By this method large sheets may be grained. To grain paper from the engraved steel and copper plates sold for that purpose, first see that the plate is perfectly clean; next adjust the pressure of the copper-plate press, place a sheet of clean paper over the plate, next a fine blanket, and run once in and out; if the paper has penetrated into the engraving evenly all over, the pressure is right; damp the back of the coated paper with a sponge and clean water moderately; when the water is absorbed by the paper, place it face downwards on the engraved plate, and upon it the blanket, run through and back, pass the thumb-nail between the paper and plate, slowly warm the plate, and assist off the paper gently. If it is desired to put a set-off on the grained paper, to save tracing, pull an impression from the outline or keystone with rather more ink than for stone, dust well with jewellers' rouge, place it face downwards on the engraved plate, and run once through the press, when an impression will be left on the plate in red dust, and on the paper being placed on it the impression is transferred to the paper at the same time the grain is given to it. As regards the transferring properties of the two methods, the grained plate gives the best results. If the engraving of one of these plates be closely examined, it will be found to consist of very minute dots arranged in a circular or oval fashion, with a dot in the centre of each. These dots are all of an equal depth, and in the resulting grain of an equal height; they are also an equal distance apart, so that in transferring, taking the pressure to be even, each receives the same pressure, and the resulting transfer is as near as possible as drawn by the artist, if ordinary care is used; but they have a somewhat stiff and mechanical effect, and it is not possible to get such large sheets as paper grained from stone, 22-in. × 18-in. being about the outside. The paper grained from stone has a sharper and more natural grain, approaching a grained stone, but the points forming the grain are sharper at the top, and not all of the same height or size, and at irregular distances apart, as in transferring they receive most pressure; and also in drawing, having taken up the most chalk, they flatten and spread, with the result that the drawing is darker in the heavy parts and shadows than intended by the artist; and in the lighter parts, the points being so very minute, receive very little chalk, and on rolling up, etching, or early in the printing, disappear, and cause the drawing to have a weak, rotten appearance in the middle and light tints. (25)

QUESTION IV.—State which of the following pigments are affected by the action of light, and those affected by impure air: chrome-yellow, yellow-lake, Prussian-blue, ultramarine, cobalt, madder-lake, crimson-lake, and geranium-lake. (30)

ANSWER: Chrome-yellow, a chromate of lead, is fairly permanent in bright light and pure air, but under the opposite influences frequently turns dark; where permanency and intrinsic excellence are required in chromo work it should be avoided. Yellow-lake, a vegetable extract in conjunction with alumina, the berries of the dyers' buckthorn being its principal source, will not stand the influence of strong light, but is uninjured by impure air; therefore should not be used for showcards or chromos exposed to strong, bright light, but reliable for book illustration and work rarely exposed to light, chiefly used as a finishing or glazing colour. Prussian-blue, a ferricyanide of iron, of which there are several varieties, is not permanent under the influence of light and impure air, and damp destroys its colour; but it is not much affected by opposite influences, and may, therefore, be used for book and similar work. Ultramarine, the genuine and costly variety of this pigment, prepared from the lapis lazuli, a precious stone found in Persia and Liberia, is under all circumstances almost unchangeable; the ultramarine now manufactured from sulphide of sodium, in conjunction with alumina, possesses in many ways the good qualities of the genuine variety, and is little liable to change under the action of strong light or impure air. Cobalt, prepared from alumina and phosphate of cobalt, will not withstand the effects of impure air, but is little affected by strong light; under the influence of artificial light it turns on the violet. Madder-lake, the genuine variety, is prepared from the root of the plant rubia tinctoria, and may be detected from other rose-coloured lakes and carmine by remaining uninjured when treated with ammonia or dilute muriatic acid; it is uninjured either by light or impure air. The most reliable of the rose-coloured pigments, crimson-lake—prepared from infusions of the cochineal insect, then precipitated by alum—will not bear exposure to strong light or pure air, but is not acted upon by impure air, and is useful for book illustrations and work to be framed or varnished. Geranium-lake, a brilliant but fugitive colour of the coal-tar series, is not permanent under either condition, and fades rapidly when exposed to the air. (25)

QUESTION V.—Describe the two processes of sprinkling (or splashing) and stippling, and say how you would proceed to prepare for proving in each case. (20)

ANSWER: Sprinkling, or splashing, is a process of throwing a fine spray of dots, irregular in shape and size, on the surface of the lithographic stone, by drawing a tooth or nail brush charged with lithographic drawing ink across the blade of a palette knife or other similar instrument, the dots being confined to their proper limits by gumming out. The operation is performed as follows:—first, stop out with gum and vermilion the margin of the stone, the high lights, and all parts of the drawing not to be sprinkled; take an ordinary tooth brush and charge it with lithographic drawing ink; the long blade of a pen-knife, palette or table knife, is taken and held over the part of the stone to be sprinkled, and the brush lightly pushed over the edge, thus throwing a spray of dots on to the stone. The less ink contained in the brush the finer the dots, and the nearer to the stone it is held the closer they will be together. When the brush has been replenished with ink it should be tried

on a piece of blank paper to ascertain if the dots are of the required shape and distance apart. After the first sprinkling the lightest tint is then stopped out, and the operation repeated for the middle tint; when dry, this is again stopped out, and the operation again repeated until the required depth of tint is reached. The chief defect of this process is that the effect cannot be observed during the operation, because all is covered by the dots, the gum alone protecting the several tints; on washing away the gum the effect is seen, and probably each tint will have a sharply defined edge. The stone must now be prepared for new work, and the edges blended by the pen or brush. It is only suitable for some classes of work, such as backgrounds or large flat spaces, and for a cheap class of work, as no delicate gradations of drawing or colour can be got by it, the dots all falling at haphazard. An American invention, called the air brush, performs this operation in quite a superior manner, and is capable of producing the finest effects both in drawing and light and shade. The machine is held in the right hand, and connected with a flexible rubber tube to a bellows, which supplies a current of air and forces the liquid ink through a very fine hole; this stream of ink is again minutely divided by a rapidly moving needle, working similar to a sewing-machine needle, and the spray proceeding from a fixed point, is under the perfect control of the artist. Stippling in lithography is a process of drawing with dots, and is peculiarly adapted for chromo-lithography. It yields very fine, soft, and pleasing effects, and may be employed in any kind of work, as the precision with which the dots may be applied as regards size and distance apart allows representations of flat and rounded surfaces and any intricate drawing being given. It is executed with pens of various degrees of fineness in the nib, and for the finest work a sable brush. Artists differ in their mode of stippling, and with long practice develop a style peculiarly their own. In the absence of illustrations it is almost impossible to give instructions how to stipple, but the study of a good chromo will supply much towards that object. A few of the chief points are: to have the ink of such a consistency that a dot is formed directly the pen touches the stone; in working a graduated effect the dots must be fine and open at the beginning, followed by others larger and closer together, until a solid black is reached; roundness of dot and repeating them in straight lines must be avoided, and in curved surfaces the contour of such should be retained by doing the stipple to the curves; it may be effectively used to tone down the harshness of hatched-line shading by stippling between the lines, but the dots must be kept small and not prominent. In preparing either class of work for proving, the dots in both cases are composed of ink of tolerable thickness, therefore care must be taken that the work is thoroughly dry; then gum up with a soft sponge and thin gum, to prevent disturbing the dots; let the gum dry, then wash off; wash out the work with turps, roll up with a stiff ink, clean away all dirt, dust with French chalk, and give a tolerably strong etch, using a brush to the darkest parts. (18)

[Splashing is better done by holding the blade over the brush, and moving it instead of the brush. It is a mistake to say that splashing is only fit for a certain and cheap class of work. It can be judiciously used in most work. Stippling is by no means the artistic method of producing prints. It may be to a certain extent pleasing in effect, but no stippling will ever equal the artistic chalking which brought lithography to the front some years ago.—Ed.]

Question VI.—How would you proceed to etch litho stone and zinc into relief? (20)

Answer: To etch a lithographic stone into relief, and at the same time preserve the fine parts of the drawing, the following method should be adopted. After the drawing has been rolled up, cleaned, and etched, wash out with turps and roll up sharp and full with an ink containing a little strong varnish, fan it perfectly dry; take equal parts of asphaltum and common resin, ground very finely together, and tie up in a muslin bag; dust the drawing well over, and brush away the superfluous powder with a camel-hair brush; wash the stone with a sponge and clean water, and fan dry; lay a sheet of hard glazed paper over the stone, and pass through the press under moderate pressure; make the stone perfectly level, and after excluding all draughts, flood the stone with a little proof spirit, and immediately light it; as the spirit consumes, the resin and fatty ink become thoroughly united, and form an impenetrable barrier to the action of the acid; when cold, the stone may be subjected to an energetic etching, by flooding the stone until the requisite depth is acquired; if any large spaces have to be removed the drawing may now be stopped out with Brunswick black, and the necessary etching given. In proceeding to etch zinc into relief, the following tools and materials are requisite: two litho nap rollers, No. 1 fine, No. 2 coarse; a glazed roller marked 3 and a rubber roller on a litho stock marked 4; a hot plate, heated either by gas or spirit lamp; an etching bath mounted on rockers; hard resisting ink, composed of beeswax 1 part, fine printing ink 10 parts; soft resisting ink, composed of beeswax 1 part, white pitch 1 part, and fine printing ink 3 parts; very soft ink, composed of hard ink 100 parts, strong litho varnish 3 parts, spirits of turpentine 10 parts; finely-powdered resin, tied up in a muslin bag; a badger-hair brush. The zinc plate with the drawing upon it having been gummed in, etched with the nut-gall solution, and rolled up, is subjected to the following operations: lay the plate upon a level table or stone, take roller 1 and add a little of the hard ink, and distribute on a slab; wash off the gum, damp the plate, and roll in evenly until a fair amount of ink appears on the lines, dry thoroughly, and dust with the powdered resin; remove all superfluous powder with the badger brush; wash in clean water, and dry; coat the back and edges of the plate with Brunswick black, and when dry immerse the plate in a three per cent. acid bath for one minute, rocking the plate all the time. To detach any bubbles of gas from the work, take out the plate, wash in clean water, dry, and place upon the hot plate until the drawing assumes a gloss; lift away the plate and allow it to cool; now paint out all the large blanks with Brunswick black, so that there will not be so much metal to remove, and when dry it is fit to receive its proper first etch;

immerse the plate in the acid bath, until the metal is eaten away to the thickness of thin plate paper, rocking the bath all the time; remove from the bath, rinse with water, dry, and place on the hot plate, until the ink begins to move down the lines; cool the plate, and roll in with No. 2 roller and soft ink, and then repeat the above operation. For the third etch the rubber roller and very soft ink is used, and the heating, dusting, and etching as before, but with a little stronger bath. If the plate is not yet deep enough, repeat the operation until the requisite depth is obtained; then wash off the ink with turps, and next a solution of potash; rinse in clean water, and dry. To remove the steps left by the successive etchings and the large blanks of metal, with the glazed roller distribute a little of the very soft ink upon the slab; slightly warm the plate, and roll in until a good layer of ink is formed upon the lines; warm the plate carefully, to thoroughly amalgamate the particles of ink, allow it to cool, and again ink in, dust with resin, and heat until a good gloss appears; lay the plate aside to cool, and then immerse the plate in a five per cent. acid bath, and rock until the spaces are eaten away to the thickness of thin card. A second and third etching may be necessary, which repeat as before, only no resin is used for the third etching. To determine the action of the acid in each etch, in a convenient part of the plate place a patch of Brunswick black, and make a few slight scratches. After the necessary etchings the plate is thoroughly cleaned on both sides, the large spaces deepened with the graver, all waste metal cut away, and the plate mounted on a block type-high for printing. (20)

[The above process, although giving good results, has been superseded by one more simple, with less rollers and less inks. —Ed.]

Question VII.—Is the principle of the heliotype process similar to lithography? Give reasons for your answer? (25)

Answer: The only similarity that exists between the heliotype process and lithography is that the picture, in both processes, has the property of repelling water used in damping, and an affinity for a greasy ink. In the heliotype process a film of gelatine is prepared on a glass plate, from which it is stripped when dry, and then printed in the ordinary way under a reversed negative; it is then mounted on a metal plate for printing. For comparison of the two processes, a brief description of the heliotype process is necessary. A glass plate, finely-ground on one side, is taken and waxed with a solution of wax in ether, rubbed well in with a pad of cotton wool; as much as possible is then removed with a little spirit, until the surface presents a polished appearance. The plate is next made perfectly level, and coated with the following solution:—Nelson's No. 3 flake gelatine, 1½-oz.; glycerine, 1 dram; water, 12-oz. and a sensitising solution of potassium bichromate, 22 grains; chrome alum, 15 grains; water, 12 drams. This mixture, after being heated to 100° F., is added to the prepared gelatine solution immediately before use, and a fine piece of muslin being tied over the mouth of the vessel, allowed to strain on to the level plate, to the thickness of thick card. Allow the gelatine to set, then place the plate in a dark room, free from dust, at a temperature of 75°. When dry, the film or skin is stripped from the plate, and allowed to stay for thirty minutes in a similar temperature and moisture to that which it will be exposed to during exposure in the printing frame. The skin is next placed with its uppermost surface on a board covered with black velvet, placed in the printing frame under a reversed negative, and the exposure timed with the actinometer, an exposure of six to ten densities being given, according to the quality of the negative. A plate of pewter, or nickelled steel, is now taken and coated with india-rubber solution, and when dry, the skin is placed in water with the prepared metal plate for two or three seconds; both are withdrawn, leaving a layer of water between the sunned side of the skin and the coated side of the plate. A squeegee is passed over and the two surfaces brought into intimate contact. The edges are then brushed round with india-rubber solution, to prevent the damping water penetrating beneath, and when nearly set the plate is immersed in water from fifteen to thirty minutes, to free it from the bichromate salt; the surface of the skin is next wiped dry, and it is then ready for printing. The plate is now laid on the bed of the press—a typographic one of the Albion type is the best—a piece of soft paper is placed on the skin, and a moderately hard pull given, this squeezes out the water and leaves the plate ready for inking. Best litho chalk ink is let down with green oil to a stiffish consistency for the deep shadows and dark parts of the picture, and a thinner ink for the light and middle tones, as the picture only takes ink in proportion to its exposure to light. A gelatine or rubber roller is charged with the stiff ink, and another with the thinnest. The surface of the skin is now damped with a sponge and clean water, the excess removed with the squeegee and a sheet of blotting paper. Roll in evenly with the stiff ink for the dark parts and then with the weaker ink, which will not disturb that first applied, and give detail to the high lights; with a moderate pressure, proofs should now be pulled, until the relief of the plate is smashed or levelled down, and satisfactory impressions obtained. It will be seen from the foregoing, that in the first instance the printing surfaces are dissimilar, the one a film of bichromatised gelatine, the other a slab of calcareous limestone; (2) the picture is produced differently, one by sunlight, the other by the artist; (3) as regards damping and inking they are almost identical, pictures on both having the properties of resisting water and attracting a greasy ink, though a little difference exists in the mode of damping; (4) the inking rollers are different, one requires a composition or rubber roller, the other a leather one; and (5) in obtaining the requisite pressure for printing, one requires the dead flat impression of the typographic press, the other the heavy rubbing motion exerted by the scraper of the lithographic press. After the requisite number of impressions are printed from the skin, it can be detached from the plate and stowed away in a portfolio for future use. (10)

A Dramatic Reconciliation

Drawn for Messrs. Mander Brothers, and printed with Mander Brothers' Inks
by McCaw, Stevenson & Orr, Ltd., Linenhall Works, Belfast.

BY CHARLES HARRAP.

CHAPTER III.—*Continued.*

Substitutes for Lithographic Stone.

IV.—Recent German Plate.

OSKAR KINDERMANN'S PLATE.

A RECENT German improvement in the manufacture of zinc-plate substitutes for lithographic stones has been patented, and consists in graining the zinc plate by the fine sand blast method until uniformly dull. The plate is then washed over with a clean wet sponge, containing a few drops of a solution of chloride of zinc, tetrachloride of tin, nitric acid, hydrochloric acid, and water. The moisture is removed by blotting or tissue paper. The above mixture is then applied evenly with a flat brush, until the plate dries. When dry, the dust formed by the mixture—being various compounds of zinc—is removed by a soft brush, and the remaining plate is found to be capable of any lithographic use. The following are the proportions for the mixture :—

Chloride of zinc	100 parts.
Tetrachloride of tin	25 ,,
Nitric acid	2 ,,
Hydrochloric acid	2 ,,
Water	1200 ,,

Plates thus manufactured have a very close resemblance to stone, and may be considered as chemically-prepared plates rather than coated plates.

In use, these plates are treated much in the same way as plain or unprepared zinc.

It should be borne in mind that zinc plates, whether prepared or not, have a tendency to readily become greasy all over, whilst at the same time work newly put upon them does not seem to get the same firmness of hold as it does upon stone. This peculiarity renders the manipulation doubly uncertain. In the first place, to keep down the scum and to increase the chemical affinity of the new work upon a plate, nothing seems more appropriate than to etch the plate very lightly with a mixture of gum and acid, just as is always the method pursued with chalk work upon grained stones. But unless the new work is drawn or transferred in a strong soapy ink or chalk, such a course of first etching might prove detrimental to the strength of the new work. Be this as it may, every printer can use his own discretion as to the strength or composition of the etching solution. One thing is certain, that all work chalked upon plates must be etched in the first instance; and it is advisable to treat all other work the same, using discretion in the strength of the etch according to the nature of the work.

The etching solution which has generally given the best results on zinc plate is prepared by steeping gall nuts in water for a day, and, after straining, add some phosphoric acid. To this is added a thick solution of best gum arabic. A good old recipe for this process is compounded by steeping four ounces of gall nuts in three quarts of water for twenty-four hours, after which the whole is well boiled and finally strained. This gives the gall-nut decoction. Next place some sticks of phosphorus in a wide-mouthed bottle about three-parts full of water. Let it stand without cork, so that the air can play about the sticks of phosphorus and the surface of the water. In a few days this will form a fairly strong solution of phosphoric acid. Phosphoric acid may be purchased from any druggist in a concentrated form.

From the above preparations the etching solution is formed by adding together and thoroughly mixing:—

Gall-nut decoction	¾-pt.
Gum (as thick as cream, and with one drop of carbolic acid in it) ...	¼-pt.
Phosphoric acid	½-oz.

The addition of carbolic acid will preserve this solution any length of time.

The etching solution thus prepared is the same as that which has for years been used for plain zinc plates. It is put on the plates either with a sponge or flat brush, and allowed to dry; after which, when patent plates are used, the process is continued as for polished stone, and not grained zinc.

At this stage it is perhaps advisable to clear up a slight misunderstanding of the word "etch." In the ordinary sense, it is accepted as a method of biting or corroding away, and in that sense applies fully to copper or steel-plate etching. But when applied to plain zinc plates and grained stones, although there is considerable acidity in the solution, yet the actual biting or corrosion of anything is not looked for at all; that is but a secondary result, which has its effect, especially with zinc plates. The real use of the etching is to effect chemical changes in the chalk or ink which has been drawn or transferred on, and to secure a closer affinity between the work and the plate. The matter thus stated in brief outline will be thoroughly discussed in detail in the chapters on "Grained Stone."

The German plate now under consideration having been treated with a weak or strong etching solution, according to the nature of the work, is allowed to dry; and it is entirely at the option of the printer whether he proceeds with it as if it were a grained stone, or as if it were grained zinc: the result will be the same.

In most other respects, as to alterations, the same methods can be applied as for the "Litho Plate" already described under section III. of this chapter.

The scumming of any zinc plates may be very greatly decreased, and entirely avoided, by the use of weak tea for damping during proofing and printing.

V.—Aluminium-faced Plates.

Of the many attempts made to substitute lithographic stone, none seem to have so nearly approached the original article as the device of putting aluminium upon a suitable support, and using it in every way the same as stone is used. This discovery is due to Messrs. John Mullaly and Lothrop L. Bullock, of New York, who patented it as an invention in the autumn of 1891. The patent up to this date has not become widely known nor widely used, but what work has been produced from this source is work of a high standard of excellence, and better altogether than zinc work.

Generally, inventors have been led to attempt to deposit upon zinc a material which in reality is very little removed in chemical composition from lithographic stone. Some, it is true, have sought simply to treat the zinc as a metal, and attempted to incorporate some of the lacking properties which would render it a counterpart of stone. But none have hitherto looked about for another metal which more closely resembles lithographic stone than zinc does. It has been left to the New York patentees to make this discovery with respect to aluminium. When this metal is used, in thin plates or thin electro plates—or in thick plates for that matter, but it is an unnecessary waste of the material—it is found to present that delightfully soft, porous nature, which gives the pleasure of working on good stones. The value of such discovery cannot be over-estimated, for it becomes one of those open secrets, available by all who wish to use it, and not a proprietary article. The claims which are put forward by all zinc-plate substitute makers, are equally applicable to this plate, whilst one or two more advantages attach to this than to any other. Not only is there a great saving of space in storage, greater durability, less weight to handle and greater conveniences in all directions than in the use of the brittle and variable German stone, but aluminium plates do not require recoating as zinc-plate substitutes do; do not require the use of a number of proprietary patent solutions for their management as zinc-plate substitutes do; can be polished, grained, drawn, or transferred upon, and printed from similarly to stone; and are not liable to so much destruction from damp and acids as either stone or zinc substitutes.

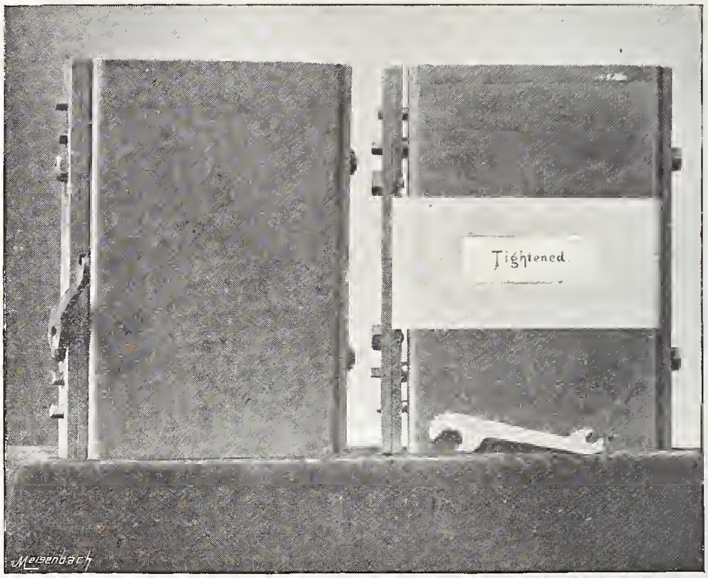
This surfacing of aluminium is, mechanically, a simple operation. The aluminium may be used in thin plates, and when required for printing can be adjusted directly to blocks or to the cylinders of the rotary machines. It is, however, a safer method to have them permanently attached to the support; and the support may be a plate of zinc or a wooden block. The thin metallic support is preferable, for it allows of ready adjustment to a rotary machine. Again, instead of thin plates of the metal being used, it may be deposited by electricity, just as electro-silver plate is deposited, upon a metallic support, in sufficient thickness to constitute a layer capable of constant use.

Plate Beds and Machines.

Simultaneously with these introductions of plates, there has been considerable attention bestowed upon the methods of fixing them for use in the present lithographic machines, as well as the construction of machinery adapted solely to printing from plates.

The beds supplied by the Hull Zincplate Company have been considerably simplified since their first introduction, and the illustration shows clearly the very small amount of mechanism involved in their manufacture. The principle of their construction is exactly what is required, viz., a drawing rather than a rolling up or winding movement.

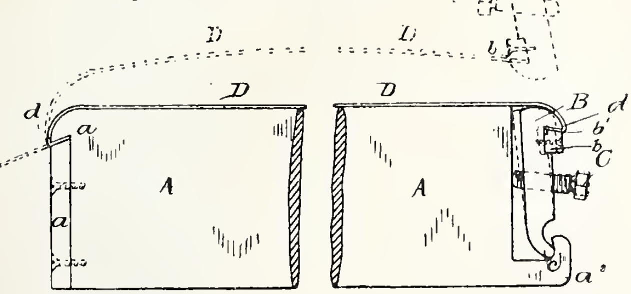
A B



In the photographic blocks appended, the one marked A shews the bed and grippers all screwed up; whilst B shews the bed as actually used. The zinc plate is adjusted to the bed by its edge being first placed down on the right-hand side of the view B, between the bed and the gripping plate, which is the full length of the bed, and is tightened up to hold the edge of the plate firmly by the two screws and nuts shewn. The plate thus held by one edge is gently bent over the rounded edge, and is brought down flat upon the face of the bed. The edge which overlaps at the other side of the bed should then be bent gently over the left-hand rounded edge. When evenly bent, the edge of the plate is placed as far down between the two gripping bars on the left as possible, and is finally held between them by the screw adjustments. The plate is now secured at both sides

of the bed; it is fairly flat, and only requires tightening up. This is effected by means of screws, which pass through taps in the gripper bars on the left, and work directly against the bed. By screwing these tightening screws the gripper bars are forced away from the bed, and in so doing the plate is drawn out perfectly tight across the bed. These beds are very simple, but in the present form are not adaptable to different sizes of machines. Messrs. Layton Brothers also supply beds for zinc plates.

Recently (1891), in the United States, a German patented one of the simplest methods of gripping

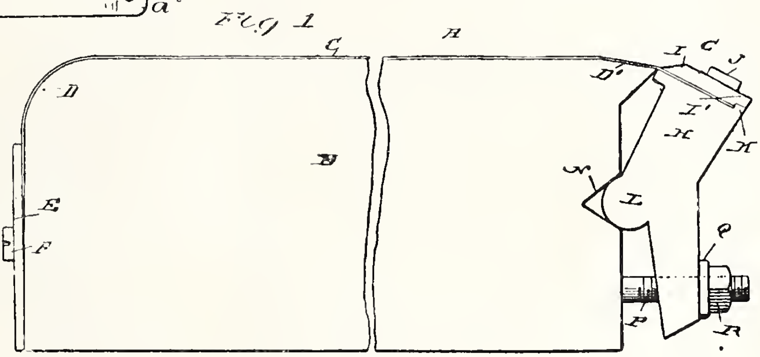


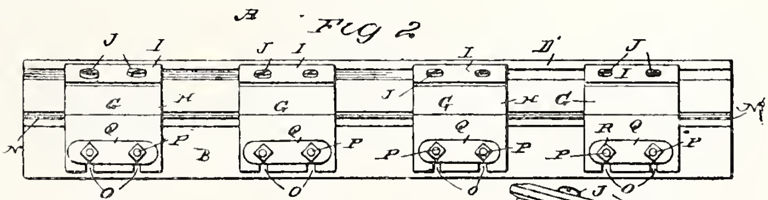
a zinc plate on a block that has yet been invented. The invention requires only one improvement, and that is to make the supporting block either telescopic or replaceable by different-sized internal blocks, thus rendering it adjustable and simple for any size of plate. In large establishments this is unnecessary, for there will be all sizes of machines in the plant, and each machine can be fitted with a bed and reserved for each size of plate. The accompanying illustration shews the entire principle of the mechanical contrivances in this patent bed, and it needs but the briefest description of its mode of use.

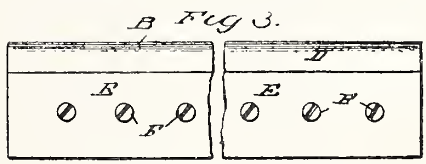
In the illnstration it can be readily seen that the plate is first slipped under the projection at the top of the left-hand side of the bed. The metal-gripper a is then placed in position and tightened up. The free portion of the plate is then carefully bent over the rounded top edge, and the free edge is next gripped in the movable piece B. This piece is turned upside down to grip the edge, so that in replacing it behind the projection a^2, the plate receives a second bend over the rounded edge of the piece B at the top, and is almost brought into its final position for printing from. To put on the stretch and flatten the plate perfectly, the piece B is screwed away from the body of the bed by turning the screw C. This contrivance has proved in every way successful, as it gives nicely-rounded edges to the plate, has never caused the plate to break or in any way to crease during the setting operation; and from the simplicity of the construction there is no barrier to having the gripping arrangements readily detachable from the bed-block, so that the same set of grippers and stretchers could be put on to any width of bed-block.

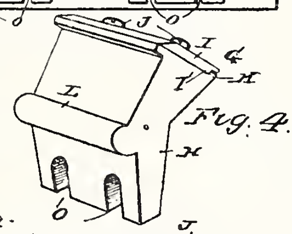
Another invention in the same direction is patented by an American. In this the grippers of the plate are made in segments, and thus any number of segments may be used to grip any length of plate. This advantage, coupled with having the grippers adjustable to any width of bed-block, finally overcomes the difficulty of being able to use the same grippers for any width or length of plate.

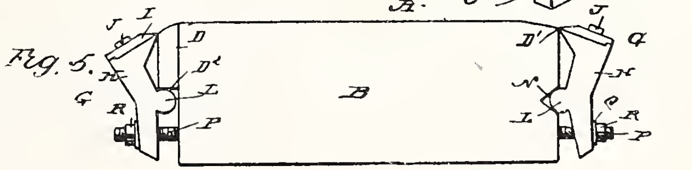
The illustrations of this patent shew its mechanical adjustments, in which it will be seen that a number of flat plates E are screwed tightly against the bed-block B. The plate having been gripped by these plates E along one edge, can be bent over the top











rounded edge of the bed-block D^1. The free edge is then led into the clamp H. The edge being firmly held by screwing down the jaw I upon the lever-clamp G. The jaw I is prevented slipping by fitting against the shoulder K of the lever-clamp G. Having secured the edges of the plate, the lever-clamp G is screwed up by the screws or bolts P. These screws draw the lower end of the lever clamp closer to the bed-block B, and by its action through the fulcrum or lug L throws the upper part of the lever-clamp further away from the bed-block, and in so doing stretches the plate perfectly flat upon the bed. For small plates the gripping-plates E may be replaced by lever-clamps, as shewn in fig. 5. Thus both edges of the plate may be submitted to the tightening up, through the bolts P. Such a repetition of the lever clamps is applicable to any plates, and must render the setting of the plates a comparatively easy and certain operation.

[*To be continued.*]

Photography in the Colours of Nature.

M. G. Lippmann, who first announced his methods in the *Comptes Rendus* early in 1891, has recently sent a communication to the Paris Academy, in which he says that the results of his subsequent experiments are sufficiently encouraging to warrant him in presenting them to the Academy. He says that on albumen bromide of silver films he has obtained brilliant photographs of spectra by the use of "azalin and cyanin" without the use of screens, and in a few seconds, though some of his specimens required several minutes' exposure. Green and grey, such as the picture of a house standing in a park, he has succeeded with, but the blue sky comes out as indigo. There seems to be no doubt that M. Lippmann has made a great step in advance. Mr. Ives has also been lecturing at the Royal Institution on his researches in the same subject, some of his pictures being really wonderful productions in nature-photography. We shall have more to say on the subject in our next issue.

The Printing and Allied Trades' Exhibition.

The London County Council have now passed the plans of the forthcoming Paper Makers, Printers, Stationers, and Allied Traders' Exhibition and Market, to be held at the Royal Agricultural Hall, London, N., and as the executive have secured a most important and representative committee to work with them, we anticipate that the forthcoming show will be fully representative of the vast interests concerned. We are informed that the applications for space are thus far very satisfactory, and it is advisable that all firms who desire to exhibit should at once make application for space. Arrangements have been made for a fine exhibit of Christmas cards, etc.; and as the dates fixed (September 20th to October 1st) are undoubtedly more suitable for the trade generally, and as printers, we hope, will have harvested the produce of the General Election, we may look for better results from this, the fifth Paper and Printing Exhibition, than from any of its predecessors.

Metallochromy.

NEW FOREIGN MODE OF LITHOGRAPHIC PRINTING ON METAL, AS DEVISED BY M. JOSZ.

Our valued French contemporary, the *Bulletin de l'Imprimerie,* in a recent issue, gives an abstract of a communication received by the Society for the Encouragement of National Industry.

Up to the present all printing on metal has been accomplished by transferring a freshly-printed sheet, or by transferring the impression from a sheet of rubber on the metal. For this it has been necessary to construct special lithographic machines in order to obtain the exact justification of the different colours going to make up the subject, and, by reason of the difficulties which the transferring of a smooth surface of colour presents, one could only obtain chromo impressions on metal made up of dots and hatchings, which absolutely excluded imitation of painting.

The body of ink applied to the smooth surface of the metal is inevitably subjected to the effects of expansion or contraction due to the different temperature to which the metallic sheet is exposed. The prints thus obtained crack at the end of a certain time and finally finish by scaling off. In order to print directly from a hard surface, such as a lithographic stone, on another hard surface, such as metal, it is necessary to render the metallic surface supple enough to take the ink with which the stone is spread without blotting or blurring the details of the subject.

To accomplish this result, M. Josz proceeds in the following manner:—On the metallic surface which is to be printed upon, there is produced, by the mechanical projection of very fine sand, a close grain, which is dilated and cleared up by immersion in different alkaline solutions. This dull and velvety surface takes a lithographic impression as well as paper or stuffs. Immediately after the impression, the metallic sheet is submitted to 50° of temperature (Centigrade?) in a special drying stove, which results in firmly fixing the ink in the press. The impression is then no longer superficial, but in the metal itself, the expansion and contraction of which it can follow without any alteration. Metallochromic imprints covered with a double coat of varnish, applied hot and fixed in the drying stove, present the same conditions of solidity as faience and enamel.

A Lithographers' Trust.—It is announced that a lithographers' trust has been formed in New York, consisting of the firms of Geo. S. Harris & Sons, of Philadelphia; Schumacher & Ettlinger; the Knapp Co.; F. Heppenheimer's Sons; Geo. H. Buck; and the Giles Co. It is to be known as the American Lithograph Co. The capital is said to be $12,000,000. The object of the trust is not to cut down prices, but to reduce the cost of manufacturing. Competition has been so strong that several of the smaller firms have been driven out of business. The firms mentioned manufacture practically all the cigar labels in the country, and the trust will consequently have a monopoly of this department.

Photography on the Litho Stone.

NEW BRITISH PROCESS WITH THE GUAIARETATES.

Experiments upon the use of a solution of guaiaretic acid, applied to hard surfaces, have been made by A. J. Boult, of High Halborn, Middlesex. His efforts were toward the production of a photograph upon either lithographic stones, glass, metal, or porcelain, and as the result of his labours there has just appeared an English patent protecting his interests in Great Britain.

It has been found that the guaiaretic acid [$C_{20}H_{26}O_4$] or its metallic salts, or those made of guaiaretic acid with organic bases, by exposure to light, change their properties as to solubility, and as to resistance to oxidizing agents.

The guaiaretic acid, as well known, is freshly prepared, soluble in alcohol, ether, bisulphide of carbon, chloroform, acetic acid, benzole, and other substances, but, by exposure to light, it becomes less or entirely soluble in these substances, like asphaltum or resinates; that is to say, the salts of abietic acid [$C_{44}H_{64}O_5$]. As far as the researches go, guaiaconic acid [$C_{19}H_{22}O_3$] is formed by this action, which latter is still more oxidized by certain likewise acting substances. A similar effect takes place by exposing the salts of guaiaretic acid with metals or organic bases, also the chlorine, bromine, and iodine substitution products or the corresponding salts, to the action of light.

Certain colours—for instance, aniline violet, magenta red, safranine—when combined in minute quantities with guaiaretic acid or its salts, accelerate the action of the light, *i.e.*, they act as sensitisers. A thin coating of this acid or its salts, laid upon a hard surface and exposed to the light for a certain time, becomes impermeable to dilute mineral or organic acids. These properties of guaiaretic acid or its salts, as aforesaid, render them useful for the production or reproduction of pictures, photographs, ornaments, *i.e.*, by means of the actinic rays.

In carrying out this invention to produce a photographic image on lithographic stone, etc., the operator first dissolves 100 parts of crystallised guaiaretic acid, or, to obtain a more sensitive film, 120 parts of dry amorphous guaiaretate of silver or a corresponding quantity of the zinc, lead, or magnesium salt (which latter are less sensitive than the silver salt) in 500 parts of pure benzole. He may use the salts coloured with three or four per cent. of aniline violet, or another aniline colour or colours. He then prepares a rubber solution by dissolving 7½ parts of dry caoutchouc in 500 parts of benzole. Instead of rubber or gutta-percha, a collodion solution, containing one to two per cent. of nitro-cellulose, may be used; the above-described composition of rubber is preferred.

Both solutions are then thoroughly mixed together, and the well-cleaned surface on which the picture is to be produced is carefully coated with the mixture thus obtained, in the dark. Then the so-coated surface is exposed under a negative or transparent positive to the action of light, a ten to twelve minutes' exposure to direct sunlight being sufficient to harden the exposed parts and to render them insoluble in the developing bath. As the best bath for this purpose, he uses a mixture of one part of benzole and five parts of spirits of turpentine. Of course, other developers can be used. The parts of the film which are not affected by the action of the light are thereby removed, and the picture appears on the surface. The plate is then dried and etched by appropriate acids, according to the nature of the surface to which the sensitive film is applied. Another method of applying the light sensitive properties of the guaiaretic acid, or of the guaiaretates to the art of production of pictures, images, or ornaments is also given.

He mixes a neutral aqueous solution of ten parts of guaiaretic acid in any alkali with 100 parts of a dilute solution of gelatine; then coats the well-cleaned surface with this solution, and dries it in the dark in a horizontal position by a heat not exceeding 120° F. The object is then put into a tray containing a weak solution of sulphuric, hydrochloric, or any other suitable acid to precipitate the guaiaretic acid in the gelatine film, or in a weak solution of a salt of a metal, for instance, of nitrate of silver, sulphate of magnesium, etc., to form a guaiaretate. The film can be more sensitised if it is brought after thoroughly washing in a very dilute bath of an aniline colour, as above-mentioned. After a second drying the film is exposed under the negative or transparent positive, and developed by means of a benzole developer. The gelatine film is then, after drying, hardened by chromic or common alum, tannic acid, or any other suitable substance. The surface is then etched in the manner described. If the picture is produced on a lithographic stone or on a metal plate, the stone or metal plate can be used as a printing plate.

(If it is desired to produce a coloured-glass picture, the etching produced on the glass plate according to the described process is rubbed in with a black pigment and the plate burned, whereby the fundamental picture is fixed on the glass plate in lines or half-tone. The colour-powders or colour-mixtures as used in the art of glass-painting are then applied to the fundamental picture, and the glass plate then burned in a muffle-furnace. The glass pictures produced by this method have a highly-attractive appearance, as the etched and blackened background imparts to the same an effective and natural expression.)

The guaiaretic acid which is used is prepared in the following way: two parts of guaiacum are dissolved in ten parts of alcohol, filtered and concentrated to a thin syrupy solution, then it is mixed with a warm concentrated solution of one part of potassium hydrate. After twenty-four hours' standing the mixture forms a mass of the consistency of a pulp, and is pressed through a filtering cloth. The remainder is thoroughly washed, first with alcohol and then with water, and crystallised by means of dilute alcohol.

Defects on the Proof.

SPOTS of dirt which are formed on the proofs or around the lines of a drawing or of its borders, and which are produced by a multitude of black points, stamped on the paper at the moment when it touches the stone or the zinc, before the scraper has passed over it, and which change their place by the stretching of the paper when the pressure is applied, constitute a more annoying than dangerous inconvenience, the causes of which are sufficiently numerous and difficult to avoid or to correct, to deserve the earnest attention of the workman.

The following are the causes and the means to remedy them :—

(1) *Too much pressure.*—All that is required is to lessen the pressure.

(2) *Folds in the backing sheets.*—These should not have the least fold or wrinkle. They must not be larger than is necessary to cover the place where the scraper passes. A backing sheet made out of two or three sheets pasted together produces fewer spots than a single sheet. By laying a smooth pasteboard, the single sheet may take the place of the compound sheet. The leather slips over the smooth pasteboard without imparting any bad effects to the proof.

(3) *Elongation of the paper.*—It is advisable to wet the paper evenly by keeping the borders a little more charged with humidity than the centre, and handling the sheets so as to keep them flat and without any folds. Under the pressure, the part of the sheet which passes under the scraper always stretches, no matter how little, whilst the borders remain as they are. It is plain, therefore, that the centre of the sheet being wetter than the borders, the former will become creased and form wrinkles, if the borders cannot follow its movement.

(4) *Paper badly soaked, too dry or too wet.*—Wet the paper over again, especially the borders, and hold it tightly in the press used for this purpose. If it has an excess of water, turn the sheets every hour, allowing it to rest in the intervals, until it is all right, and submit it finally to a rather strong pressure.

(5) *Leather of the frame not stretched sufficiently.*—The leather forming the tympan must be perfectly well stretched on its four faces, so as to prevent its stretching further under the friction of the scraper, and displacing in the least the sheet laid on the stone. An insufficiently stretched leather forms a fold before the scraper, which is reproduced in the paper, and contributes to make the sheet take the ink before the pressure. There must be a certain distance between the leather and the stone, if it is desired that it should not touch the sheet before the moment when the scraper reaches it. When the slurring is caused by the leather, the printer should raise the frame either by the side of the hinges, or by means of the vice, or he should stretch the leather by tightening very closely the screws serving this purpose.

(6) *Drawing too much charged with black.* (7) *Black too adherent.* (8) *Black insufficiently ground.*—Use a black as firm as the circumstances will permit, to prevent its clouding. Replace the black by a more compact black if the printing black is not hard enough. If the black is not sufficiently ground, change it and scrape the roller and the ink slab. Wet the drawing, take it up in blank with turps, ink over again with the new black, print a pale proof, and drive in the black slowly.

(9) *Stone insufficiently dry.*—The printer should wet moderately his stone, lay the sheet on carefully, not dragging it but holding it by the two opposite corners, when he thinks that the stone is sufficiently dry. If he does not use these precautions, he will be liable not only to obtain spotted proofs, but also to impaste the drawing or composition.

(10) *New stone.*—Every proof taken on a new stone which has not been washed with turps, and which has been finished for a long time, will turn out spotted until the drawing has undergone this operation.

In case these means described above proved insufficient, M. Desportes suggested to his pupils two others, with which we are acquainted, and which appear to be infallible :—

(1) To ink the drawing only once, to gum and let it rest for twenty-four hours.

(2) In summer, when the stone shows a decided tendency to impaste, to stump, or to spot, it is advisable to put it to soak in fresh (cool) water for one or two hours.

The spotting is more easily produced on China than on ordinary paper, as the former snaps more than the latter. To prevent this accident, M. Engelmann advised to print only on China-paper at first, without using paste to fix it on another sheet. The China sheet laid alone, from its being lighter, presents fewer resisting folds, and does not take the black before applying the pressure. When these proofs are dry they are pasted on the white paper, by means of a second pressure on the polished stone. This refers to the large stones and the large drawings. But when the printing is done on China-paper of ordinary size, the proofs are pasted beforehand on the white paper, without running the risk of spotting. To this effect the China-paper is first placed on a polished stone, and on it the white sheet, dampened. It is unnecessary to say that the side of the China sheet where the paste is laid should be turned towards the white sheet. Then the whole is covered with a backing sheet. In passing under the scraper, the two sheets pasted together are flattened and stretched in all directions as much as it is possible. In receiving the impression they will not contract any longer wrinkles or become enlarged. In order to make the China-paper occupy exactly the middle of the white sheet, the printer should make two bench-marks on the stone and use needles to lay his sheet.

—CH. VERNEUIL, *in L'Imprimerie.*

THE printers of Milan, Italy, are reported to be organising a strike for a weekly rest day, work on Sundays being the rule there.

The Preparation of "Copy" for Photo-Engraving.

The widespread introduction of the photo-engraving process known as the half-tone method is evident in all the best modern publications, and the advantages possessed by it are undoubted. At the same time the results are so unequal that it is evident there must be some good reason for the differences which are to be seen in the products of the same establishment, or of those of equal reputation. The process was originally intended to furnish a means of making photo-engraved plates direct from the ordinary photograph or silver print, but it has to-day acquired a far wider scope. Without going into details, the method consists in working through a finely-ruled screen or grating, by which the various gradations of the original photograph are replaced by a network of lines practically converting the whole into a mass of dots, which can be etched upon metal and used in an ordinary printing press in connection with type matter. By inspecting such a picture with a strong magnifier the structure will be plainly seen.

Such a method involves an unavoidable degradation of the fine detail of the photograph, and tends at the same time to reduce contrast and flatten the general effect. The dark shadows become grey and the brilliant high lights are dulled, and the whole effect is often most discouraging. It was soon found that good results were only obtainable from very brilliant prints having almost harsh contrasts, and many soft beautiful photographs lost their best points by this method of reproduction.

The application of the process has been extended most effectively to the reproduction of plates from wash drawings, and in many recent works, mainly of French production, the illustrations are in half-tone work from brush drawings in black and white, and the bold impressionist work lends itself admirably to this method. By combining this idea with that of photography, most effective results may be obtained, and the writer has recently obtained in this way a series of plates for the illustration of an important line of machines which are, in the opinion of competent critics, superior to anything which could be made by any process of hand-engraving.

The machines in question were a series of cranes and hoisting machines, photographed under numerous disadvantages, and occasionally with objectionable surroundings. The plates were about double the scale of the proposed illustrations, and the "copy" for the photo-engraver was prepared as follows :—

A brilliant silver print was made, merely to serve as a guide in the subsequent work. Then a print on plain salted paper was also made, care being taken to secure a rather weak picture, in order that any undesirable point might be left inconspicuous. This print was toned and fixed as usual, and mounted, and was then thoroughly worked up by hand, using Chinese white to heighten the high lights, and lamp-black to deepen the shadows. The points about the machine which it was desired to emphasise were made as brilliant as possible, while the background was softened and reduced. Of course, this work required a skilful draughtsman, but as the drawing was all there, it only involved a careful hand and the exercise of judgment in the placing of lights and shades, and the art is soon acquired.

The resulting picture, while strictly accurate in all its details, was so highly exaggerated in contrast as to be almost harsh, but this is just the necessary degree to stand the reduction in effect which is produced by the process.

The worked-over photograph was then sent to the photo-engraver, and its appearance was hailed by him with delight. The resulting plate was most brilliantly effective, and was rendered still more so by a very little hand-tooling on a few of the high lights, just cutting out a point or two, and running the graver along the brilliant lines of the polished work.

The success which attended the plan caused a number of such plates to be made, and it has since been extended to other subjects with equal satisfaction. By making the originals larger than the finished plates, the sharpness due to the reduction is obtained and the work of the draughtsman is made much easier, as he has broader surfaces to deal with.

The question of cost depends upon the character of the work, but is in all cases much less than that of wood engraving, and the results are vastly more artistic and effective.—HENRY HARRISON SUPLEE, *in American Annual of Photography.*

M. LEPIRRE, a French artist, states that in demonstrating that sulphur melted at about 115° can be cooled in paper, he happened to use a lithographed card, of which the edges were turned up ; upon taking away the card it was discovered that the lithographed characters were clearly and distinctly impressed upon the cooled surface of the sulphur, remaining thus after hard friction and washing. By repeated experiments in this direction he has succeeded in obtaining results of a very satisfactory character, removing the paper each time by a mere washing and rubbing process. It is found, in fact, that sulphur will receive impressions from and reproduce, in a faithful manner, characters or designs in ordinary graphite crayon, coloured crayons, writing ink, typographical inks, china ink, lithographic inks—whether coloured or uncoloured varieties—and others. He also states that it will reproduce maps with remarkable exactitude.

IN the *Figaro,* M. Camille Flammarion gives a graphic and enthusiastic account of the great Lick telescope, under the heading of "A New Eye." Its crystalline lens is formed of an immense piece of glass, and its retina of a highly sensitive plate. It sees quicker, farther, longer, and—precious faculty—it fixes, prints, and preserves what it sees. This new eye is the photographic eye.

New Method of Photo-Zincography.

Experiments of August and Louis Lumiere, France.

The method of these gentlemen, as just offered in a French contemporary, *L'Imprimerie*, is a modification of what is known as the albumen process. The facility and rapidity with which this method permits the obtaining of prints of great delicacy, shallowly engraved in *intaglio*, and the possibility of employing a phototype positive in the place of the usual negative (by way of screen) constitute advantages incontestably worth while making known to such persons as are interested in photographic processes applicable to printing.

The greater number of existing methods require reversed negatives at once transparent and strong, conditions difficult to obtain at the same time; besides, the manipulations to which their use gives rise are delicate, and only lead to satisfactory results after long practice.

"Our method," say the Messrs. Lumière, in M. Vidal's journal, "does not present the same difficulties. By conforming exactly to the following directions, there will be obtained pictures exempt from all defects, susceptible of furnishing excellent lithographic plates, or of being transformed into blocks suitable for typographic impression. The first thing is to prepare the following solution :—

Water	1,000	parts.
Albumen of eggs	100	,,
Bichromate of ammonia ...	3	,,

Ammonia, sufficient quantity to colour the solution light yellow.

"The mixture is thoroughly shaken, filtered with care, and then spread with a spatula on a sheet of polished zinc previously cleaned with whiting. As soon as a thin coat of albumen is thus obtained it is advisable to hasten the drying of it by slightly warming the plate. It is then exposed to the light under a positive, after which, the exposure being judged sufficient, the zinc is taken out of the frame, and with a roller is covered with a thin film of ink, *à report*,* to which has been added some medium varnish. It should appear deep grey, without any sign of an image or picture, and not black.

"Upon immersing in luke-warm water the design appears very shortly, and can be very easily brought out by rubbing the surface of the zinc lightly with a little tuft or wad of cotton.

"The image so obtained is a negative, and the metal is bared at the points representing the black in the original. The albumen has in fact remained soluble at these points, having been protected by the corresponding lines in the positive screen during exposure to the light.

"The plate is then rinsed with plenty of water, dried, and plunged into a solution of perchloride of iron at 35° B., in which it should remain from ten to fifteen seconds. It is washed and then again dried. Upon subsequently passing over the zinc, heated to about 50°, a roller charged with the ink designated, and medium varnish, the ink adheres over the whole surface. A black picture is thus made, after which the deep parts are brought out by the aid of a smooth roller which is passed rapidly several times over the plate. There remains only to rub the bed with a piece of muslin soaked in caustic ammonia. The picture appears in black, standing out from a brilliant background formed by the zinc. During this operation, the bichromated albumen, insolubilised by the light, dissolves in its turn in the ammonia, and a second development is thus operated, the inverse of the first.

"By the rubbing, and with the aid of the ammoniacal liquid, the ink is removed from the points at which the insoluble albumen is prominent, while the ink remains fixed to the zinc in the engraved parts."

This last reaction is the basis of Messrs. Lumière's method, and constitutes the novel side.

It is exceedingly curious to watch this inversion of the primitive image under the influence of the ammonia. The solutions of potash, soda, etc., or of their carbonates, do not bring about such clear results, probably by reason of the saponification of certain elements going to make up the ink employed, and also because these substances do not possess the considerable diffusive power of the ammonia.

If the sheet is to be printed from lithographically, there only remains to prepare it in the ordinary manner by means of gallic, phosphoric, or chromic solutions.

If, on the other hand, it is to be thrown into relief for typography, it should be powdered over with pulverised resin and then heated in the ordinary manner before proceeding to the first biting-in.

In the latter case it is preferable to shorten the time of immersion in the perchloride of iron, in order to avoid too appreciable pitting at the points which should be in relief.

* This ink is, as usual, transfer ink. As mentioned here, it is the same as is used in the *impression en report*, which consists in transferring on stone, plates (of music) engraved. See Littré, *Moniteur Universelle*, June 18, 1867, p. 760, 3d col. [Translator's note.]

"Plant Form" Supplement, No. 5.

Garden Pea.

The subject of the accompanying illustration, although one of our commonest vegetables, is so extremely decorative in character that its beauties can never be exhausted. The Garden Pea (Pisum Sativum) belongs to the order Leguminosæ, has a white flower, and is of a pale glaucous green throughout, that is stems, leaves, and pods, when young; the first two runnings brown slightly after they are matured, while the pod assumes a yellow hue when ripe.

The order of its growth is so constant that it is particularly adapted for ornamental work of all kinds, its nature as a climber making it especially suitable for wrought iron. Although its colour may be rather limited, its sturdy play of hue fully compensates for its apparent lack of variety in that respect.

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The Theory of Colour.

LOUIS PRANG'S INVESTIGATION INTO PRISMATIC SPECTRA AND PRIMARY COLOURS.

LOUIS PRANG recently read before the Prang Conference of the Normal Art School a paper on colour that cannot fail to command the attention of scientists, artists, and educators. According to the Boston *Evening Transcript*, of a recent date, Mr. Prang modestly but squarely took issue with the scientists, Young, Helmholtz, Maxwell, Von Benzold, Church, and Rood, on fundamental points in the modern scientific theory of colour, and by experiments with the Maxwell rotary disc showed not only that yellow and blue light when properly combined produce green, but also that red, yellow, and blue, when properly combined, produce white. These are the two chief points upon which the scientific theory of colour has been erected as opposed to the artistic theory. Mr. Prang's paper was throughout full of valuable suggestions to both the scientists and the artists, showing the careful observations of the phenomena of colour combined with a familiar knowledge of the researches of previous observers.

The pigment theory of colour—that on which the work of the artist is practically based—assumes simply the existence of three primary or elementary colours, red, yellow, and blue, by whose combinations in varied proportions all other pigment colours can be produced. The scientific researches of the present century have led to the denial by the scientists of this artistic or pigment theory, the claim being made that, as colour is only a name for the effect produced by physical action of waves of luminiferous ether impinging upon the optic nerve, the elements of colour must be sought for through the study of the laws of light and of physiological optics. Scientists at present agree in denying that red, yellow, and blue are correctly to be regarded as primary colours, but they do not agree as to what colour sensations should be considered as fundamental.

Imagine a wave of (white) light as an entity in itself, containing all the physical forces which go to make up the phenomena in colour, but which, while in perfect equilibrium, have the effect of white. When these physical forces lose this state of equilibrium they produce the sensation of colour. When all the elements which go to make up white light are completely dispersed, there should be made evident the presence of all the different coloured rays which the eye can distinguish. [A chart was here shown exhibiting the "ideal colour circle," including red, blue, yellow, and an indefinite number of intermediate hues approximately represented by twenty-four pieces of coloured paper.]

Such an ideal colour circle included all the elements which together make up white light. Experiments in combining rays of light of colours that are directly opposite each other in such a circle show that such pairs of opposites produce white light, indistinguishable by the eye from the white light produced by the commingling of all the colours in the circle at once. These pairs of opposite or complementary colours are the same that have long been recognised by artists, and they also agree with the subjective complementaries found by the old experiment of gazing intently for several seconds at a patch of some given colour and then looking at a white surface.

We have in nature no perfect illustration of the complete dispersion of the coloured rays which combine in white light. In the prismatic spectrum we have the nearest approach to such complete dispersion, but from the prismatic spectrum there are always lacking certain colours from violet to red (spectrum

MICHAEL HANHART.

[*By a mistake, caused by the photographs and instructions getting displaced, the wrong portrait was inserted in our last issue in the concluding paper on " The Rise and Progress of Lithography in Britain."*]

red, not typical red). It is indisputable that a certain range of colours between violet and spectrum red must exist potentially in our unit of white light, for though the spectrum does not display them with the rest, they are reflected to our eyes by many natural objects, and could thus be reflected only on condition of their existence among the components of white light. The prismatic spectrum cannot therefore be regarded as a complete representation of the contents of nature's colour unit. When we investigate the pairing of complementary colours in the spectrum we find that these complementary relations are changed. They are not what they were in our ideal colour circle; they are not what our subjective colour impressions lead us to expect. Close experimental observation

of the complementary pairing of spectrum colours leads now to a new understanding of the action of the prism on the impinging ray of white light. The prism not only refracts the ray and disperses its components, but also alters the relative luminosity of these various components, and causes a portion of them, including the true red, to disappear entirely. By the true red is meant a red which is perfectly free both from blue and from yellow. The action of the prism seems to cause a transferring energy from the red portion of the spectrum to the green.

The action of the pigments or colour materials upon white light is quite analogous to that of the prism, only more aggressive. While the prism alters the relative luminosity of all the component colours and suppresses a certain few, any given pigment despoils of luminosity all the colour-rays except those of some particular colour or combination of colours suppressing all the rest. If to a pigment colour its complementary be added, luminosity is still further reduced, grey appearing in the mixture; if the addition is carried to the point of balancing the first colour by its complementary, the result is a complete destruction of luminosity, that is black.

Since pigments, or colour materials, are available which, in turn, reflect to the eye all the various components of white light, and since by the mixture of such materials the reflected colours may be "broken" indefinitely, we are enabled by the resources of pigment colour and by pigment colour alone to unlock the colour possibilities of light, and utilise them for study and for the expression of colour ideas.

Mr. Prang quoted the oft-repeated declaration of the scientists that blue and yellow lights produce not green but white, and showed by the aid of the Maxwell disc how this declaration, while true of experiments with a certain particular blue and yellow, is untrue of a combination of the ideal blue and the ideal yellow. For ideal blue he used a blue free from both red and yellow; for ideal yellow a yellow free from both blue and red. His experimental demonstration was perfect and showed that the scientist's mistake had arisen from too loose a use of the names blue and yellow, these names being applied in everyday parlance to a great variety of impure hues. Following this experiment, Mr. Prang showed by the use of the Maxwell wheel that the typical red, yellow, and blue do, in combination, produce white of low luminosity. The reason why the possibility of this has been denied by scientists lies also in their wrong choice of colours for experiment, using impure instead of pure hues.

Next was considered the scientific claim that yellow and blue cannot be primaries, because yellow can be obtained by the mixture of red and green, and blue by the mixture of green and violet. Mr. Prang showed by other experiments that these statements of result are true, but he also showed that the scientifically accepted inference from these facts is wrong. The red of the spectrum is not a pure red, but one containing a good deal of yellow. When a typical green combines with such a red, the complementary relation is not perfect. There is present an excess of yellow over and above the elements necessary to form white light, and this residue of yellow naturally gives the resulting light a yellowish tinge; that is all. Experiments with green and violet were tried before the audience and explained in an analogous manner.

Charts illustrating the laws of colour mixture were next shown and explained, the lecturer emphasising his firm conviction of the importance of considering subjective as well as objective colour, meaning by subjective colours those sensations of colour which are caused by the reaction of the optic nerve. Such subjective colour sensations exist simultaneously with the objective sensations, and here there enters into the problem of education an element hitherto little appreciated—the element of personality in the observer. The training of the individual sense of colour to delicate responsiveness and appreciation must be made an essential part of any proper system of colour instruction. Such education of the physiological perception, and of subjective judgment of colour should be begun as early as possible, for the optic nerve, if neglected in early life, is only with great difficulty made sensitive and responsive to the subtler influences of colour.

Mr. Prang's intention is to publish very soon an extended account of his investigations, the apparatus he has devised for experiment and illustration, and the conclusions his study of the subject has led him to adopt. Arrangements are being made for a similar publication in Germany, where the subject of colour is receiving close study, and fresh contributions to its literature are eagerly welcomed.—*Lithographers' Journal.*

Long-Distance Photography.

It is said that long-distance photography is rendered quite a success by the new camera, with a telescopic objective, of Dr. Adolf Miethe. The object consists of a convex lens of considerable length of focus and a concave lens of short focus. These are placed a certain distance apart, depending upon the difference of the two foci. By the laws of optics, this arrangement projects an inverted image of an object at a long distance from the lenses. The size of the object is greater the nearer the lenses are together, and the greater the difference between the foci. To obtain good images, the lenses are of special form and achromatic. The whole camera looks very like a Galilean telescope. By substituting an ordinary opera glass for the objective on the camera, and drawing it out, a fairly good picture will be obtained on the ground glass of the camera. Excellent detail photographs of parts of the city of Potsdam have been taken two miles away by Dr. Meithe's apparatus.

B.L. Examination Papers, No. 5.

As surmised in a previous paragraph, the summer season has greatly limited the number of competitors, which in the No. 5 examination has only amounted to one in the Advanced and one in the Ordinary Grade. This number is not satisfactory, and for the present we shall withhold an award.

The State of Trade.

THE usually slack season for lithography has this year been considerably livened up by the general election. It scarcely matters in what part of the country you go, there are few if any complaints of slackness.

In Lancashire generally the trade is very brisk, and leaves no cause for complaint. In Cumberland, although there are only two centres for the business —Carlisle and Whitehaven—yet they have gone through their crisis without much loss. It is pitiable to see the great iron works and the coal industry along the Cumberland coast in such a state of desertion, and it is from this cause that the smaller commercial firms have had to face a long depression. From the general tone of the inhabitants thereabouts it seems to be believed that it will take years to revive those industries and bring back the prosperity of the past. What a different picture is to be seen in the pottery towns of Hanley, Burslem, Longton, and Stoke. There, every factory is in the fullest swing of business and our own trade is at its height; so much so that firms are seeking assistance.

Trade in Nottingham is easy. Of course, those firms which specially cater for the annuals and almanacs are on the verge of their busiest season, and are anything but slack just now. Although there are occasional rumours of slackness, yet, when other firms are putting down machinery it is a sure sign that the business is not actually leaving the town. Even though it may be said that much of the lace trade has left Nottingham, yet printers who supply lace designers cannot see any difference, and some men who should know actually say there is more lace made there than ever. Business has grown there to such an extent that the surrounding district of Radford, Basford, and Bulwell has become a second Nottingham. It is said that a lot of Nottingham business has gone to Leicester, and the printing trade *there* cannot be said to be on the decline. Quite the reverse, for although some of the old business may be done now in the potteries, yet other business is being obtained, and the putting down of new plant augurs well for the future.

The large centre of Birmingham detracts from the importance of neighbouring lithographers. But both in Wolverhampton and Walsall the firms have their own class of business, and do it well.

Even at such places it is found that Birmingham work is printed, whilst other firms simply farm their work to send it on to Birmingham. Strange to hear these little places, with proportionately lower cost of production, complaining of Birmingham competition!

In the important centre of Derby there seems to be more than one good lithographic establishment turning out both quantity and quality of work. From what can be seen of business there, it seems that it will soon become the second centre for collotype printing, equalling in quality of production anything done elsewhere.

In Manchester and the neighbourhood there seems no lack of employment for its 150 firms, large and small. Yet, work can be actually seen going away from Manchester to be done by the energetic firm in Ulverston.

In the west and south-west business is undoubtedly in a fairly good condition. Even the little cities of Worcester and Gloucester have plenty of lithographic work. Firms in Bristol have all they can do; but on the whole cannot be said to have the energy of the printers in Cardiff and Newport. In the latter—especially Cardiff—there seems to be a genuine ring of steady business. Further south, in Plymouth, Exeter, and Torquay, there is a large amount of lithography turned out, especially from two or three firms in Plymouth and two in Exeter. Cheltenham, too, shews signs of awakening to the printing world, and ultimately its three firms may make themselves better known than at present.

The great strides being made by typographic printing have taken some lithography away, and in some colour printing it requires a man of no mean experience to decide whether the print is a lithograph or not. Chromo-lithography for commercial purposes can scarcely be said to increase in the same ratio as the population or as the factories, but chromo supplements have become so extensive as to shew a very large increase upon the work of past years. There are still a few publishers who print copies of pictures and studies for artists for sale, but that class of business cannot be said to hold the position it did when Rowneys went so thoroughly into it, some couple of decades ago.

Trade Reports.

(From our Special Correspondents.)

BRISTOL.

THE first annual outing of the Bristol branch of the Amalgamated Artists and Engravers' Society took place on Saturday, July 2nd, when they journeyed by brake to Portishead. Representatives and members of the society from the following firms attended:—Messrs. Mardon, Son, & Hall, Milk-street; Lavars, Broad-street; Jefferies & Son, Back-hall; Allen, Davies & Co., Nelson-street; and Fry Bros., Quay, besides several employing engravers and a number of friends. A substantial tea was partaken of at the Royal Pier hotel at 6 p.m., the chair being taken by Mr. Smith (president of the society), and various toasts were submitted. During the afternoon sports were indulged in, and a capital walk was arranged through the woods and other places of interest. The party returned to Bristol about 10.50, having spent a most enjoyable day.

As is customary at times of such festivity, the artists themselves always embellish the occasion with prettily-designed circulars and tickets, and the present one was no exception. The circular and ticket were extremely pretty examples of lithographic art.

Derby.

Business here is reported good, and everyone fully employed, Bemrose & Sons' (Ltd.) collotype department being specially busy. There are only three non-society lithographers in Derby, and all the union men are fully employed.

The technical class in lithography, conducted by Mr. Hall, though only "a little band," have again done credit to their instructor by securing a medal and two first-class and three second-class passes in the recent examinations.

The lithographic artists' department of Bemrose and Sons (Ltd.) had their annual outing on Saturday, July 9th, the place selected being Dovedale. Leaving Derby at 7 a.m., an enjoyable drive brought them to Ashbourne at 9-30, where a substantial breakfast was provided at the "Green Man." Thence the party visited the grand old church, and continued their drive to Dovedale, arriving there about 12 o'clock. Whilst some of the party roamed about the lovely dale, others visited the grand old village of Tissington, celebrated for its wells and avenue. After dinner the party was photographed. A fine morning turned to a rainy afternoon, and many of the party were drenched by the time Derby was reached, about 10.30 p.m. The arrangements were in charge of Mr. Terry.

The lithographic department of Bemrose & Sons (Ltd.) went on Saturday afternoon, July 16th, with their wives, sweethearts, and olive branches, to Bakewell, the unpropitious weather causing the abandonment of a projected visit to Lathkill Dale. Whilst awaiting tea, the party visited the old parish church, the many interesting monuments, and other antiquities, as well as the beautiful modern portions of the sacred edifice, being explained in an interesting manner by the verger. After tea, to which the party did ample justice, the weather cleared up, and they then proceeded to Haddon Hall, thoroughly enjoying the visit to that remarkable relic of mediæval times, the historic and legendary incidents which cluster round the noble mansion being explained by the guide. Whilst in the banqueting hall, Mr. S. D. Hall, the foreman of the department, drew the attention of the party to the fact that in that room, twenty-six years ago, a presentation was made to the late Mr. William Bemrose on the occasion of the first trip given by the firm to their employées, which had been continued every summer since. Leaving Haddon Hall, the party proceeded to Rowsley, and reached Derby at 10.15, all having thoroughly enjoyed the outing, notwithstanding the unfavourable weather at the commencement.

Hanley.

Our correspondent in this district reports trade as steadily improving.

The old-established firm of Messrs. Allbut & Daniel had their wayzgoose on Whit-Monday at the seaside, Rhyl being the place selected. A substantial dinner was thoroughly enjoyed, and after-dinner oratory cut short to allow of a full enjoyment of the beautiful weather and delightful scenery; boating, riding, and visits to places of interest in the neighbourhood being extensively indulged in. The party returned to Hanley about 9-30, having greatly enjoyed their day's outing.

The annual sports in connexion with the firm took place on June 25th at the Finney Gardens, and though the weather was "mixed," about a thousand visitors were present. There was capital music by the Hanley Excelsior Prize Band, and an assault at arms by the Hanley Colts Club was a decided success. There were eleven events to be contended for, and at the close the prizes were distributed by Mr. H. P. Daniel, who, after complimenting the winners, congratulated those present on the increasing success each year of these athletic contests.

At both the wayzgoose and sports hearty votes of thanks were awarded to those responsible for the management.

Leicester.

The lithographic business in Leicester has been very good in the past two months, and members of the technical class are much elated over their success in the City and Guilds of London examination. To pass twenty-two out of twenty-seven who sat for examination, and to secure two (silver and bronze) out of the three medals given (with the Pewterer Company's money prize in each case added), with ten first-class certificates, is highly creditable to both teacher and students. Such gratifying results should give the class a good send-off for next session, when it is to be hoped that Mr. Hall's valuable services will be again secured.

Just as we go to press we learn that the Committee of the Ellis Technical School have arranged to take over the Leicester class in lithography, paying all expenses, including the teacher's salary. Mr. S. D. Hall has again expressed his willingness to undertake the work of instruction, and the employers in the town will raise a prize fund. Efforts are also being made to start a class in typography.

Liverpool.

The trade here has been reported very busy for the season of the year. In the recent examinations the litho technical class came out creditably, securing seven passes, the teacher, Mr. Honeyman, taking a "first." We hope to see a longer list next year.

London.

We hear there is again considerable discussion and many complaints at the indifference of the authorities of the East London People's Palace to the widely-expressed desire for a lithographic technical class there. No doubt the manager has plenty to do already in catering for his big family of students, but in this case the materials are ready to hand, and only want introducing to each other, when the class will "run itself." The only class in London is at the "far west"—at the Polytechnic—and the teacher there (Mr. W. Layton-Wilson) informs us that the falling off in numbers of his class as the winter advances is solely due to the distance away from their homes of the students who live in the "far east." It is time someone interested themselves in this matter. A strong pull and a pull altogether—and *at once*—ought to prove successful.

Mr. W. Layton-Wilson has worked hard in the past session to make his class a success, and if it does not quite come up to its old form it is not his fault. Twenty went up for examination, and the number would have been larger, but "so many living a long way off found it very trying during the winter months." We know what this means to youths and young men who have been hard at work all day, and think it highly creditable that so many persevered through the session.

The interest in these technical classes is undoubtedly increasing, and we learn that a special and early effort is to be made to secure an increased attendance in the coming session.

Manchester.

Trade in the Manchester district amongst lithographers has been generally good in the past two months, much extra work having been caused by the elections.

The class in lithography at the technical school (conducted by Mr. Harrap) has done creditably, securing two first and seven second-class certificates.

Norwich.

The Norwich branch of the Amalgamated Lithographic Society had their annual outing on Saturday afternoon, July 9th. Starting at two o'clock, they had a most enjoyable drive through the country to Wroxham, well known in Norfolk for fishing and yachting. After a short stop they proceeded to Coltishall, a very pretty village on the river Bure, where a hot meat tea was ready, served up in good style, and had ample justice done to it. After tea the time was spent in various games, the party arriving home in good time after a most enjoyable half-day's outing.

Plymouth.

Business here is reported good. Mr. Geo. Palmer, having severed his connexion as partner in the firm of Mitchell, Williams & Co., lithographers, Union-street, has commenced business on his own account in Market-place.

In *The Art Journal* for June a brief notice of Sir John Pender's collection of pictures includes a copy of "Phœbe" and "The Night before the Murder of Rizzio." In this number can be seen a sketch portrait of L. Alma Tadema, R.A.; and in the July number similar sketches of Val Prinsep, A.R.A., and B. W. Leader, A.R.A., all at work on canvasses. The June journal contains an etching, full of good treatment, by H. Macbeth Raeburn, from Yeend King's picture, shewn in last year's New Gallery, entitled "The Lass that Loves a Sailor." The etching, however, in the July number is simply excellent. The etcher, C. O. Murray, has not lost one bit of the motion and truly natural delineation of the sea, so ably painted in "The Three Fishers." A continuation of the articles on "Outings in India" again shows what grand scenery there is in our great Eastern possessions.

L'Ecole Gutenberg, the new technical school for young printers recently opened in Paris, is reported to be proving very successful.

Fleming's Patent Solidified Oil.

This oil, used chiefly by letterpress printers, has an unknown value to the lithographic printer. It is true that some lithographers have used it, and have used vaseline with considerable success. It is not to them the following remarks are offered, but rather to those who are seeking a solution to a number of difficulties in printing, which not only spoil the work but spoil the printer's temper.

To obviate the use of raw oil and such materials to soften an ink, and facilitate the printing of bronzes and heavy body colours upon good and indifferent papers, this "solidified oil" is very useful.

To obtain its fullest possible value, it is necessary to rub the oil smoothly on the rollers before inking them with some reds, and such colours that do not take readily to the rollers, whilst all other inks can be put on in the usual way.

A feature of the "oil," which carries its own recommendation, is to overcome many of the difficulties arising from hot and cold weather. In winter, its use will remove the abnormal tendency of inks to stiffen; and in summer it will always keep the work clear. In use, it being perhaps not altogether free from a greasy tendency, it must be employed judiciously, only sufficient being added to bring the ink into a workable condition, and it must be used by itself. It is in every way a substitute for oils, turps, and varnish, and in preparing an ink, the "oil" is gradually added just as varnish is, until the ink is made ready for use. This latter state may not be guessed correctly at the first attempt, but a little practice will render it quite easy of determination. The printer has everything to gain by patience. The "oil" is calculated to improve the colours, to make some colours which generally become thin and washy—such as oriental blue—workable, to assist in obtaining a smooth, unvarnished appearance in solid patches of a print, to make the working of bronze inks on poor paper possible, and not in any way to impede the drying qualities of an ink.

Not only does it serve these offices well, but it has a quality quite foreign to varnish, and that is, to preserve roller skins by rolling them up well in the "oil" alone before putting away. To bring them back into use, the roller requires the same treatment as it would receive after having been put away under grease. This benefit is extended to rollers which are left covered with an ink prepared with this "oil." And, finally, the "oil" can be used as an effective lubricant for heavy or fine machinery.

This "oil" possesses most, if not all, of the qualities which other English and Continental "solid oils" have, and in addition it is not at all extravagant in price. It is manufactured, as its name implies, by the large printing ink manufacturers, Messrs. A. B. Fleming & Co., Edinburgh.

Monsieur Charavay, director of *L'Imprimerie* died at Taverny, on May 26th, aged 34 years. He was the son of the republican writer, Gabriel Charavay, whom he succeeded in 1879.

Book Notes.

ETCHINGS are undoubtedly becoming very popular, if we may judge from the excellent examples constantly appearing in the leading art journals. *The Magazine of Art* for June contains a fine etching, by J. Dobie, from "Circe" (J. W. Waterhouse, A.R.A.) To judge from the etching the picture itself must be a charming production. The expression of the sorceress is one which conveys at once the pleasure which a cruel woman has in working acts of playful spitefulness; and the etcher has not failed in the least to give the full weight to the artist's novel imagination of this subject. Other than Professor Herkomer's papers upon scenic art, which must be instructive to theatricals and interesting to the public generally, there is very little matter in the journal which, when once read, need be remembered. In the July number, the frontispiece is a specimen of photogravure, beautifully executed. Of the subject and its treatment very little can be said in its praise. It is commonplace, and not over-attractive. But as a photo-mechanical production it is excellent. The magazine contains also portraits of Mr. W. Crane and Professor Herkomer, R.A.; and some fine process prints of that life-like, mirthful sculpture by Georges Van der Straeten.

"PHOTOGRAPHY" ANNUAL, a Compendium of Information upon Photographic Matters and the Annals of Photography for the past year (Iliffe & Son, 3 St. Bride-street, E.C.; 2/6). As might have been expected, the success of the first *Photography* Annual has given so much encouragement to the editor that he has been enabled to present the second volume as a bulky collection of still further interest and extended scope. The work is divided into sections, and well illustrated by various processes of engraving from negatives supplied by a widely extended class of contributors, making a specially valuable feature of the book. Section I. is a photographer's *vade-mecum,* giving valuable and extensive tables of reference such as are in constant use amongst photographers. Section II. is devoted to practical "tips" for tyros, and amongst many valuable tips, those treating of lantern matters, mounting and toning, and the hand camera are worth a good deal to the beginner. Section III. is a well-up-to-date history of photography during the last year, shewing the progress made in the several branches of the science. This is an especially interesting chapter and most useful to photographers of all grades and experience. Section IV. contains selected articles on practical subjects by practical men, and amongst a capital series of papers, those on out-door work, "magpie" negatives, true retouching, and photography for wood-engravers may be mentioned as full of wrinkles. Section V. is calculated to save much time and trouble to the artist who is endeavouring to obtain materials, being a very complete setting forth of novelties and improvements in photographic apparatus and materials. The details and prices are given with every article, and a pithy remark epitomises each. Section VI. treats of optical lanterns, accessory apparatus, and lantern slides, and will be extremely useful to lecturers. Section VIII. is a somewhat unique chapter, giving details of the various photographic societies of the United Kingdom, and is guaranteed to be thoroughly up-to-date. In the same section, and for the first time in the history of photographic literature, the trade marks registered in connection with the trade are presented in concise and readily-referable form. Section IX. contains a most complete directory to the photographic trade, and manufacturers, dealers, and chemists are alike detailed. A special word of praise must be given to the illustrations in the volume: these are invariably excellently printed, and show side by side for ready comparison the work of the leading process houses, not only of this country, but of the Continent and America, and the world-wide progress of the art is thus practically illustrated. We have nothing but praise for this volume, and recommend all photographers to get a copy for themselves.

A THOROUGHLY up-to-date gazetteer is an essential part of the equipment of every business house, and the last edition of the "Pocket Gazetteer of the World," a veritable *multum in parvo*, published by John Walker & Co., Farringdon House, Warwick-lane, E.C., is one that can be confidently recommended as filling the requirements of a good work of this class. Besides the usual geographical "Enquire Within," illustrated by some nine maps, the edition contains a special supplement in the shape of a chapter devoted to a summary of the recent census returns at home and abroad, making a useful occupant of the office bookshelves.

FROM *The Magazine of Art* for July we read:—"It is notable that the medal of honour for engraving in the Salon has been awarded to M. Maron for his two works in lithography—a method of expression (or drawing), which, never quite cultivated as a fine art in England, has long since been driven out of all fashion by mezzotint, etching, and line engraving. M. Maron thus defeated such artists as Messieurs. Lefort, Le Couteux, J. Jacquet, and Léveillé." However much honour this paragraph throws upon M. Maron, yet there seems to be an undercurrent of feeling in which lithography scarcely gets its full mead of consideration. The writer has apparently overlooked the thousands of lithographic productions from all parts of the world which contain more merit than one half of the so-called pictures hung upon art gallery walls. Many of the latter are but to be compared with the work of the new apprentice to lithography.

ANATOMY in England apparently does not receive that attention which it gets in France. Undoubtedly, a man must understand anatomy thoroughly before he can attempt a work of sculpture. Whether it is that sculpture fails to attract the eye as readily as pictorial art, or whether it is more difficult, it is hard to say; but it is certain that whereas there are but 157 pieces of sculpture in this year's Academy, in the Paris Salon there are 1,200 pieces out of some 2,500 pieces sent in.

Notes and Queries.

[*Through this channel anyone submitting a question upon printing or allied processes can receive an answer, either from our staff of practical technical writers secured for this Journal, or from some reader who may be better qualified to answer "special" questions.*]

In reply to Mr. Davis (London), we recommend him to use a stone to stone retransfer ink compounded on the old recipe. Melt 2-oz. of lithographic writing ink. Mix 2-oz. of lithographic printing ink with 2-oz. of mid. varnish, and when thoroughly incorporated add it to the hot writing ink. It requires to be well mixed after the adding together. In use it may be thinned a little to make it workable, ordinary printing ink being added for the purpose.

In reply to Mr. C. R. Hume, of London, the qualities of stearine are almost as he suggests by his questions. It is a strong grease, not readily soluble in turpentine. Used with turpentine it is very effective in restoring worn-out work; but in so doing it certainly does frequently leave a scum. This should be watched at the outset and sufficient gum kept upon the stone. Work restored in this manner should be left for a time, to get a good hold again before attempting to run the machine. It is not customary to use it in printing inks, but if so used would act similarly to the addition of a tallow. It would certainly tend to thicken the work. The proper material to be used in the ink is one of the "solidified oils" now in the market, which it seems would exactly suit your class of work, and would assist in clear, ready drying printing without the least thickening of the work.

In reply to "Daisy Bank," Glasgow, it is impossible at present to give any satisfactory testimony of any mechanical appliance to obviate stretching of paper. The unsized paper is certainly difficult to deal with, especially during changeable weather. There are ways and means of minimising the fault, which are old and well tried. Previous to printing, the paper should be exposed as nearly as possible, sheet by sheet, to the same air as it will be printed in for a day or two, and after each printing it should be placed in racks in small piles, or hung up to loose the extra moisture taken up from the stone, previous to putting on another colour. If the expansion is not taken out by this means, it is necessary to dry the sheets a little in a drying room until the register is satisfactory. The latter method has often proved very successful.

In reply to "Salmon," we can state that the method most successfully applied to printing a good black on a solid bronze, is:—Print the bronze ink thin, just enough to take a full cover of bronze dust. Allow the bronze ink to dry a little, before dusting. When dusted, let it dry well and finally wipe it off clean. Any good black—not a common one—with a touch of blue in it, and prepared with either "Fleming's Oil" or Trochard's "Pommade Emolliente" instead of varnish, will print almost as well on the bronze as upon plain paper.

Replying to L.C. (Bradford), he may know that the question he asks is one which has puzzled the brains of hundreds of printers, and has never been satisfactorily solved yet. We have occasionally seen a good dark ink printed upon bronze—most frequently a crimson of some kind—but in every case where this has occurred we have not been able to find out why it was so good. Perhaps on another occasion the same printer has failed to print with equal force. The general failure arises from not being able to print a sufficient body on the bronze to cover it. The black ink should be of a very good quality, and may be improved by a little extra blue. It must not be ground too stiff, but should be sufficiently soft to allow a large body of ink to be printed so that much of it could sink and form a basis for the upper part. The ink might be softened by using one of the volatile oils, such as cloves, carraway, or even terebene; or Fleming's oil may be used alone to grind the ink into.

(See also answer to "Salmon.")

Answers to Correspondents.

In reply to Mr. Clarke, of Derby, we are much obliged to him for pointing out the matters on which any criticisms are offered. Question 8 in our second examination paper was intended by the examiner to cover hand-press register only, and he consequently treated the answers which dealt with machine register as supplementary matter and marked them accordingly. He was clearly under the impression that no candidate would for an instant consider the point of machine register at all in connection with the question. However, it is an indication which shall not be lost sight of in the future in preparing questions, so that no possibility of doubt can occur. In the answer to No. 1 question, advanced series, the successful candidate does not by any means place such emphasis upon "coating whilst warm," as your letter implies. His answer is at once both correct and not so; had he said "to be applied whilst warm *or cold*" he would have covered the whole ground. We only trust that every candidate will send in answers of equal merit to those of the first paper. We do our best to add footnotes or marks of some kind wherever a flagrant error occurs, but when an answer is so nearly accurate as this, we should consider it quite unnecessary to tamper with it.

Within the past few weeks Mr. Lumb Stocks, R.A., passed away at the age of eighty. He was the last practising line engraver connected with the Academy. Although many may not know him by name, yet his productions include some of such celebrity that they simply require to be mentioned to be at once called to mind. The following are just a few of this eminent engraver's works:—"Claude Duval" (Frith), "Meeting of Wellington and Blucher" (Maclise), "The Princes in the Tower" (Millais), "Dr. Johnson in the Antechamber of Lord Chesterfield" (Ward), and his last plate, which is spoken of in the highest terms, and said almost to excel any previous one, "The Spanish Letter Writer" (Burgess).

Specimens.

[*Will our friends kindly remember to send their specimens either* TIGHTLY ROLLED *or* FLAT BETWEEN BOARDS; *the cost is but a trifle more, and for review they gain in being presented as they came from the machine. If sent unprotected, specimens are usually so crushed and disfigured as to be utterly unfit for criticism or preservation.*]

FROM the antipodes (New Zealand) we have received a couple of very tastefully designed booklets and a few greeting cards, printed and published by Mr. A. D. Willis, lithographer, of Wanganui. The booklets are small 4to in size, and are entitled respectively "The Land of the Moa," and "Hinemoa." "The Land of the Moa" is the native name for New Zealand, and the booklet is a poem by E. E. M. Montgomery, illustrated with spirited sketches (by "G. S.") of native manners and customs, buildings, scenery, fauna and flora, birds, &c., all lithographed in monochrome; "Hinemoa" is a romantic native legend—the old story—told in verse by the same author, illustrated by the same artist, and printed in sepia tints. The execution is thoroughly good both in drawing and printing. The greeting cards—mostly also representing native manners, customs, and sports—are also all lithographed in monochrome (browns and greys) on white and tinted enamelled surface cards, and the execution is equally as good as in the booklets. Mr. Willis is to be congratulated on the good taste shewn in his productions as much as on the finished character of his workmanship.

MESSRS. CATLOW & ELLWOOD, lithographers, of Leicester, send us a varied collection of their recent productions in chromo work, including showcards, presentation addresses, certificates, and labels. The artists' work throughout is specially fresh and tasteful, the colour treatment bright and effective, and the technical execution well up to the commercial standard of the day in every detail. A showcard for a manufacturer of poultry food, embodying portraits of prize poultry, is remarkably well done and could scarcely be surpassed for completeness. Messrs. Catlow and Ellwood are to be commended on the excellence of their work.

MESSRS. CAMPBELL, MARSDEN & CO., 18 Laurence-lane, Cheapside, E.C., make engraving in the free and fresh American style a speciality, and the specimens submitted, including a new business card for the firm, are proof that they have not only "caught on," but combine really artistic taste with novelty in effect and the finest execution. An inspection of their miscellaneous specimens affords ample evidence that any class of designing and engraving work may be safely entrusted to them with the certainty of its coming out right.

SOME dainty little vignettes engraved by Mr. G. L. Henderson, King-street, Cheapside, E.C., of which he has sent us proofs, are admirable both in design and execution, and go far to prove that he is really an artist-engraver and not simply a routine follower of other men's ideas. We hope in our next number to present an artistic specimen of Mr. Henderson's work.

A PRETTY menu card in red and gold on a grey tint, the work of M. Leon Beyaert, Courtrai, Belgium, is as excellently printed as it is tastefully designed. M. Beyaert's forté lies in illuminated designs of the monastic order of decoration, and his productions—of which he from time to time favours us with specimens—are frequently met with in Catholic schools and institutions in the United Kingdom.

Reversing a Negative.

TO print through a negative and avoid the blurring effect from the thickness of the glass, the middle of the day should be selected, and the edge of the frame placed against the shadow of a vertical object, as the side of a window, and moved frequently as the sun's motion makes it necessary. With care the thickest glass may be printed through in this manner without blurring.

If greater accuracy is desired, and especially if it is necessary to print several hours before or after noon, a simple apparatus may be improvised for keeping the printing frame in the proper position, facing the sun. My arrangement is this: I screwed one side of the printing frame to the end of the cover of a starch box, so that the face of the frame would be at right angles with it, facing outwards. A small pin in the cover, near the middle of the frame, served as a centre of revolution. I then placed a short, flat board nearly parallel with the earth's equator; that is, with the southern end elevated about 45 or 50 degrees. A small hole was made near the upper end to receive the pin, when the cover with the attached frame was placed upon it. The shadow of the side of the frame being brought parallel with the side of the cover, the frame faced toward the sun, and could be kept so by a slight motion upon the centre every two or three minutes during the printing. The frame can be at any time removed to examine the progress of the printing, and replaced, if the board is not disturbed. The sun's declination causes its rays to pass through the glass at a small angle; but this angle remaining unchanged causes no indistinctness. If there are light clouds around the sun, they will cause a blur; otherwise the sharpness will depend upon the care with which the shadow is kept in its proper place.—HENRY M. PARKHURST.

THE dry bones of the old *Printing Times and Lithographer,* which has been defunct for some months, are to be resuscitated by Messrs. J. G. Smith & Co., with Mr. J. S. Morris as editor. No. 1 comes to hand just as we go to press.